San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

OCT 13 2010

Mr. Brent Winn
Aera Energy LLC
P.O. Box 11164
Bakersfield, CA 93389-1164

Re: Notice of Preliminary Decision - ATC / Certificate of Conformity
Facility # S-1547
Project # S-1084210 & S-1084433

Dear Mr. Winn:

Enclosed for your review and comment is the District's analysis of an application for Authorities to Construct for Aera Energy LLC Heavy Oil Western stationary source, CA. The project is to install up to eleven (11) new 85 MMBtu/hr steam generators equipped with low NOx burners.

After addressing all comments made during the 30-day public notice and the 45-day EPA comment periods, the Authorities to Construct will be issued to the facility with Certificates of Conformity. Prior to operating with modifications authorized by the Authorities to Construct, the facility must submit an application to modify the Title V permit as an administrative amendment, in accordance with District Rule 2520, Section 11.5.

The public notice will be published approximately three days from the date of this letter. Please submit your written comments within the 30-day public comment period which begins on the date of publication of the public notice.

If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Thank you for your cooperation in this matter.

Sincerely,

David Warner
Director of Permit Services

DW: DG/cm

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

OCT 13 2010

Gerardo C. Rios, Chief
Permits Office
Air Division
U.S. EPA - Region IX
75 Hawthorne St.
San Francisco, CA 94105

Re: Notice of Preliminary Decision - ATC / Certificate of Conformity
Facility # S-1547
Project # S-1084210 & S-1084433

Dear Mr. Rios:

Enclosed for your review is the District's engineering evaluation of an application for Authorities to Construct for Aera Energy LLC Heavy Oil Western stationary source, CA, which has been issued a Title V permit. Aera Energy LLC is requesting that Certificates of Conformity, with the procedural requirements of 40 CFR Part 70, be issued with this project. The project is to install up to eleven (11) new 85 MMBtu/hr steam generators equipped with low NOx burners.

Enclosed is the engineering evaluation of this application and proposed Authorities to Construct # S-1547-1162-0 through '-1180-0 with Certificates of Conformity. After demonstrating compliance with the Authority to Construct, the conditions will be incorporated into the facility's Title V permit through an administrative amendment.

Please submit your written comments on this project within the 45-day comment period that begins on the date you receive this letter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Thank you for your cooperation in this matter.

Sincerely,

David Warner
Director of Permit Services

DW: DG/cm

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

OCT 1 3 2010

Mike Tollstrup, Chief
Project Assessment Branch
Air Resources Board
P O Box 2815
Sacramento, CA 95812-2815

Re: **Notice of Preliminary Decision - ATC / Certificate of Conformity**
Facility # S-1547
Project # S-1084210 & S-1084433

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of an application for Authorities to Construct for Aera Energy LLC Heavy Oil Western stationary source, CA. The project is to install up to eleven (11) new 85 MMBtu/hr steam generators equipped with low NOx burners.

The public notice will be published approximately three days from the date of this letter. Please submit your written comments within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Thank you for your cooperation in this matter.

Sincerely,

David Warner
Director of Permit Services

DW: DG/cm

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

Bakersfield Californian

NOTICE OF PRELIMINARY DECISION FOR THE PROPOSED ISSUANCE OF AUTHORITY TO CONSTRUCT

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Air Pollution Control District solicits public comment on the proposed issuance of Authority To Construct to Aera Energy LLC for its heavy oil operation at Heavy Oil Western stationary source, California. The project is to install up to eleven (11) new 85 MMBtu/hr steam generators equipped with low NOx burners.

The analysis of the regulatory basis for these proposed actions, Project #S-1084210 & S-1084433, is available for public inspection at http://www.valleyair.org/notices/public_notices_idx.htm and the District office at the address below. Written comments on the proposed initial permit must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, 34945 FLYOVER COURT, BAKERSFIELD, CA 93308.**

San Joaquin Valley Air Pollution Control District
Authority to Construct

New Steam Generators

Facility Name:	Aera Energy LLC	Date:	10/06/2010
Mailing Address:	P O Box 11164	Engineer:	Dolores Gough
	Bakersfield, CA 93389	Lead Engineer:	Allan Phillips AP SUPERVISE
Contact Person:	Brent Winn		OCT 12 2010
Telephone:	661-665-4363		
Fax:	661-665-7437		
E-mail:	btwinn@aeraenergy.com		
Application #(s):	S-1547-1162-0 through '-1180-0		
Project #:	S-1084210 and 1084433		
Deemed Complete:	May 5, 2010		

I. PROPOSAL

Aera Energy LLC (Aera) is an oil production company. Aera is requesting Authorities to Construct (ATCs) for the installation of up to 22 new 85 MMBtu/hr natural gas-fired steam generators at two locations within the Belridge Oilfield within Aera's Heavy Oil Western stationary source. The steam generators will be installed as two separate projects based on the two locations.

The first project (Project 1 – consisting of Project #s S-1084210 and S-1084433) will be located within the northern area of the "project" area (Appendix A) and is the subject of this evaluation. Full buildout of this project is expected to occur by 2012. The second project (Project 2 – consisting of Project #s S-1084406 and S-1084434) will be located within the southern "project" area and will have a separate evaluation. Per Aera, the status, extent, and timing of Project 2 will be somewhat dependent on the success of a biomass steam generation facility proposed by Global Greensteam, which would provide steam to a portion of the second project area. As both Project 1 and Project 2 are part of a common business plan by Aera, they are the same "project" for Federal NSR applicability.

Nineteen (19) ATCs will be issued for each project for a total of thirty eight (38) for both projects (locations). Each project will consist of the following options (see summary chart below):

Option 1: Installation of eleven (11) new 85 MMBtu/hr steam generators equipped to achieve 5 ppm NOx @ 3% O2.

Option 2: Installation of eight (8) new 85 MMBtu/hr steam generators equipped to achieve 7 ppm NOx @ 3% O2.

Aera may install a combination of steam generators from Options 1 and 2, not to exceed maximum allowable emissions based on 11 steam generators with a limit of 5 ppmvd NOx.

Summary of AERA Project Proposal							
Location	**Project Option**		**Annual emissions (lb/yr)**				
			NOx	**CO**	**PM_{10}**	**SOx**	**VOC**
1	11 SG @ 5 ppmv NOx	or	49,990	151,608	62,282	17,210	24,585
	8 SG @7 ppmv NOx		46,720	108,040	44,384	12,264	46,720
	Combination of above may be installed not to exceed emissions equivalent to the 11SG @ 5 ppmv						
2	11 SG @ 5 ppmv NOx	or	49,990	151,608	62,282	17,210	24,585
	8 SG @7 ppmv NOx		46,720	108,040	44,384	12,264	46,720
	Combination of above may be installed not to exceed emissions equivalent to the 11SG @ 5 ppmv						
Total emissions, for both locations combined (not to exceed emissions from equivalent of 22 SG @ 5 ppmv NOx)			99,980	303,216	124,564	34,420	49,170

For Option 1, three (3) of the eleven (11) steam generators will be equipped with Selective Catalytic Reduction (SCR) system to achieve 5 ppm NOx @ 3% O2 to satisfy BACT and Rule 4320 requirements. Eight of the steam generators will be equipped with ultra-low NOx burner capable of achieving 5 ppmv NOx @ 3% O2. Eleven ATCs will be issued for this option.

For Option 2, all of the eight (8) steam generators will be equipped with ultra low NOx burners to achieve 7 ppm NOx @ 3% O2 to satisfy BACT and Rule 4320 requirements. Eight ATCs will be issued for this option.

Up to eleven steam generators from Options 1 and 2 may be installed with maximum emissions limits calculated using 11 units at 5 ppm NOx. This option will allow Aera the flexibility to install the needed equipment and still be in compliance with applicable District requirements.

Aera received their Title V Permit on January 31, 2003. This modification can be classified as a Title V Minor Modification pursuant to Rule 2520, Section 3.20, and can be processed with a Certificate of Conformity (COC). Since the facility has specifically requested that this project be processed in that manner, the 45-day EPA comment period will be satisfied prior to the issuance of the Authority to Construct. Aera shall apply to administratively amend their Title V Operating Permit to include the requirements of the ATCs issued with this project.

II. APPLICABLE RULES

District Rule 2201	New and Modified Stationary Source Review Rule (9/21/06)
District Rule 2520	Federally Mandated Operating Permits (6/21/01)
District Rule 4001	New Source Performance Standards (4/14/99)
District Rule 4101	Visible Emissions (2/17/05)
District Rule 4102	Nuisance (12/17/92)
District Rule 4201	Particulate Matter Concentration (12/17/92)
District Rule 4301	Fuel Burning Equipment (12/17/92)
District Rule 4305	Boilers, Steam Generators and Process Heaters - Phase 2 (8/21/03)
District Rule 4306	Boilers, Steam Generators and Process Heaters - Phase 3 (3/17/05)
District Rule 4320	Advanced Emission Reductions Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (10/16/08)
District Rule 4351	Boilers, Steam Generators and Process Heaters – Phase 1 (8/21/03); Not applicable – located west of I-5
District Rule 4405	Oxides of Nitrogen Emissions fromExisting Steam Generators Used in Thermally Enhanced Oil Recovery – Central and Western Kern County Fields (12/17/92); Not Applicable – these are not existing steam generators
District Rule 4406	Sulfur Compounds from Steam Generators – Kern County (12/17/92) Not applicable – ATCs issued after 9/12/79
District Rule 4801	Sulfur Compounds (12/17/92)
CH&SC 41700	Health Risk Assessment
CH&SC 42301.6	School Notice

Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. PROJECT LOCATION

The steam generators will be operated at the following various specified locations at the Belridge Oilfield within Aera's Heavy Oil Western stationary source in Kern County.

Equipment Locations				
ATC	Section	Township	Range	
S-1547-1162-0 through S-1547-1180-0	SW/4 Section 20	28S	21E	MDB&M
	NE/4 and SE/4 Section 29	28S	21E	MDB&M
	NW/4, SW/4 & SE/4 Section 28	28S	21E	MDB&M

The above locations are not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project. A map of the proposed locations is included in Appendix A.

IV. PROCESS DESCRIPTION

The new steam generators will be used for steam enhanced oil production at various specified locations. The steam generators produce steam, which is injected into the formation to lower the viscosity of underground deposits of crude oil and thereby increase oil flow.

The steam generators will be authorized to burn only PUC, FERC regulated natural gas, low-sulfur produced gas or treated produced gas from Aera's Section 32 gas plant (S-1543). They will not be authorized to burn gas from Aera's thermally enhanced oil recovery operation (TEOR) casing vent gas collection systems or vapor control systems.

Depending on the location, the steam generators will provide steam to steam enhanced wells permitted under S-1547-359 (1,657 wells), S-1547-638 (396 cyclic and 5,384 steam drive wells), S-1548-423 (300 wells) and S-1548-470 (8 wells). The produced fluids will continue to go to existing vapor controlled tanks at Dehy 20 (S-1548-144 et al) and Dehy 2 (S-1547-888 et al).

V. EQUIPMENT LISTING

Equipment Description:

S-1547-1162-0 though '-1169-0 (eight identical steam generators with ultra-low NOx burner):
85 MMBTU/HR NATURAL GAS-FIRED STEAM GENERATOR WITH COEN MODEL QLN-ULN ULTRA LOW NOX BURNER, OR NORTH AMERICAN MODEL MAGNA FLAME LEX ULTRA LOW NOX BURNER, OR ADVANCED COMBUSTION TECHNOLOGY OR EQUIVALENT, APPROVED TO OPERATE AT VARIOUS SPECIFIED LOCATIONS

S-1547-1170-0 through '-1172-0 (three identical steam generators with SCR):
85 MMBTU/HR NATURAL GAS-FIRED STEAM GENERATOR WITH NATIONWIDE BOILER MODEL CATASTAK SELECTIVE CATALYTIC REDUCTION SYSTEM OR EQUIVALENT, APPROVED TO OPERATE AT VARIOUS SPECIFIED LOCATIONS

S-1547-1173-0 though '-1180-0 (eight identical steam generators):
85 MMBTU/HR NATURAL GAS-FIRED STEAM GENERATOR WITH COEN MODEL QLN-ULN ULTRA LOW NOX BURNER, OR NORTH AMERICAN MODEL MAGNA FLAME LEX ULTRA LOW NOX BURNER, OR ADVANCED COMBUSTION TECHNOLOGY GIDEON ULTRA LOW NOX BURNER OR EQUIVALENT, APPROVED TO OPERATE AT VARIOUS SPECIFIED LOCATIONS

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

The steam generators in this project are capable of generating NOx, CO, VOC, PM10 and SOx emissions due to the combustion of natural gas. Aera plans on using PUC or FERC natural gas, low-sulfur produced gas, or treated produced gas from Section 32 gas plant (S-1543). The sulfur content of each of these gas streams is ≤ 0.75 gr-S/100 dscf.

Three (3) of the steam generators will be equipped with a Selective Catalytic Reduction (SCR) system. SCR systems selectively reduces NOx emissions by injecting ammonia (NH3) into the gas exhaust stream upstream of a catalyst. NOx, NH3, and O2 react on the surface of the catalyst to form molecular nitrogen (N2) and H2O. SCR is capable of 90% NOx reduction. The most commonly used catalyst material is titanium oxide, although vanadium pentoxide, noble metals and zeolites are also used. The ideal operating temperature for a conventional SCR catalyst is 350 to 750 deg F. Exhaust gas temperatures greater than the upper limit (750 deg F) will cause NOx and NH3 to pass through the catalyst unreacted.

Sixteen (16) of the steam generators will be equipped with ultra-low NOx burner capable of achieving 5 to 7 ppmv NOx @ 3% O2. Low-NO_X burners reduce NO_X formation by producing lower flame temperatures (and longer flames) than conventional burners. Conventional burners thoroughly mix all the fuel and air in a single stage just prior to combustion, whereas low-NO_X burners delay the mixing of fuel and air by introducing the fuel (or sometimes the air) in multiple stages. Generally, in the first combustion stage, the air-fuel mixture is fuel rich. In a fuel rich environment, all the oxygen will be consumed in reactions with the fuel, leaving no excess oxygen available to react with nitrogen to produce thermal NO_X. In the secondary and tertiary stages, the combustion zone is maintained in a fuel-lean environment. The excess air in these stages helps to reduce the flame temperature so that the reaction between the excess oxygen with nitrogen is minimized.

The proposed SCR system will meet NOx level equivalent to the most stringent technologically feasible option for NOx. Per applicant, steam generator and burner manufacturers indicate that 5 ppm NOx can also now be achieved with just a low-NOx burner in an oilfield setting.

VII. GENERAL CALCULATIONS

A. Assumptions

- Steam generators operate 24 hours/day and 365 days/week.
- Steam generators are fired exclusively on gaseous fuels.
- Maximum heat input rating per generator = 85 MMBtu/hr
- Natural Gas Heating Value: 1,000 Btu/scf (District Practice)
- F-Factor for Natural Gas: 8,578 dscf/MMBtu corrected to 60°F (40 CFR 60, Appendix B)
- Maximum annual fuel use for each SG = 745,000 MMBtu/yr (per applicant) for Option 1.
- Maximum annual fuel use for each SG = 730,000 MMBtu/yr (per applicant) for Option 2

B. Emission Factors

Option 1:

Pollutant	Project Emission Factors (EF2)			Source
NO_X	6.1 lb-NO_X/MMscf	0.0061 lb-NO_X/MMBtu	5 ppmvd NO_X (@ 3%O_2)	Applicant's Proposal
SO_X	2.1 lb-SO_X/MMscf	0.0021 lb-SO_X/MMBtu	0.75 gr-S/100 scf	Applicant's Proposal
PM10	7.6 lb-PM10/MMscf	0.0076 lb-PM10/MMBtu		AP-42 (07/98) Table 1.4-2
CO	18.5 lb-CO/MMscf	0.0185 lb-CO/MMBtu	25 ppmv CO @ 3% O2	Applicant's Proposal
VOC	3 lb-VOC/MMscf	0.003 lb-VOC/MMBtu	--	Applicant's Proposal

Option 2:

Pollutant	Project Emission Factors (EF2)			Source
NO_X	8 lb-NO_X/MMscf	0.008 lb-NO_X/MMBtu	7 ppmvd NO_X (@ 3%O_2)	Applicant's Proposal
SO_X	2.1 lb-SO_X/MMscf	0.0021 lb-SO_X/MMBtu	0.75 gr-S/100 scf	Applicant Proposal
PM10	7.6 lb-PM10/MMscf	0.0076 lb-PM10/MMBtu		AP-42 (07/98) Table 1.4-2
CO	18.5 lb-CO/MMscf	0.0185 lb-CO/MMBtu	25 ppmv CO @ 3% O2	Applicant's Proposal
VOC	3 lb-VOC/MMscf	0.003 lb-VOC/MMBtu	--	Applicant's Proposal

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since these are new emissions units, PE1 = 0 for all criteria pollutants.

2. Post-Project Potential to Emit (PE2)

Option1:

Daily Post-Project Potential to Emit (PE2), lb/day					
Pollutant	EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Hours/day	Daily PE	
				Each SG	Total**
NOx	0.0061	85	24	12.4	137
SOx	0.0021	85	24	4.3	47
PM10	0.0076	85	24	15.5	171
CO	0.0185	85	24	37.7	415
VOC	0.003	85	24	6.1	67

Annual Post-Project Potential to Emit (PE2), lb/yr					
Pollutant	EF (lb/MMBtu)	Fuel use (MMscf/yr)	MMBtu/yr	Annual PE Each SG	Annual PE Total**
NOx	0.0061	745	745,000	4,545	49,990
SOx	0.0021	745	745,000	1,565	17,210
PM10	0.0076	745	745,000	5,662	62,282
CO	0.0185	745	745,000	13,783	151,608
VOC	0.003	745	745,000	2,235	24,585

** Maximum project emissions

Option 2:

Daily Post-Project Potential to Emit (PE2), lb/day					
Pollutant	EF (lb/MMBtu)	Heat Input (MMBtu/hr)	Hours/day	Daily PE Each SG	Daily PE Total
NOx	0.008	85	24	16.3	131
SOx	0.0021	85	24	4.3	34
PM10	0.0076	85	24	15.5	124
CO	0.0185	85	24	37.7	302
VOC	0.003	85	24	6.1	49

Annual Post-Project Potential to Emit (PE2), lb/yr					
Pollutant	EF (lb/MMBtu)	Fuel Use (MMscf/yr)	MMBtu/yr	Annual PE Each SG	Annual PE Total
NOx	0.008	730	730,000	5,840	46,720
SOx	0.0021	730	730,000	1,533	12,264
PM10	0.0076	730	730,000	5,548	44,384
CO	0.0185	730	730,000	13,505	108,040
VOC	0.003	730	730,000	2,190	17,520

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Facility emissions are already above the Offset and Major Source Thresholds for all the criteria pollutants; therefore, SSPE1 calculations are not necessary.

4. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post-Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Facility emissions are already above the Offset and Major Source Thresholds for all the criteria pollutants; therefore, SSPE2 calculations are not necessary.

5. Major Source Determination

Pursuant to Section 3.24 of District Rule 2201, a major source is a stationary source with a Post-Project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the Major Source threshold values (excluding ERCs banked onsite that have not been used onsite).

This source is an existing Major Source for all the criteria pollutants and will remain so. No change in Major Source status is proposed or expected as a result of this project.

6. Baseline Emissions (BE)

The BE calculation (in lbs/year) is performed pollutant-by-pollutant for each unit within the project, to calculate the QNEC and if applicable, to determine the amount of offsets required.

BE = Pre-project Potential to Emit (PE1) for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit (80% of pre-project emissions), located at a Major Source,
- Any Fully-Offset Emissions Unit (a unit for which offsets have been provided), located at a Major Source, or
- Any Clean Emissions Unit located at a Major Source.

Otherwise,

BE = Historic Actual Emissions (HAE)

Since these are new emissions units, **BE = PE1 =0** for all criteria pollutants.

7. Major Modification

Major Modification is defined in 40 CFR Part 51.165 as "*any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act.*" Because Project 1 and Project 2 (as described in Section I of this document) are part of a common effort by Aera, they are the same "project" for federal NSR purposes. Since Project 1 and Project 2 involve the same number of units, the total "project" emissions are twice of those quantified in this application review.

As discussed in Section VII.C.5 above, the facility is an existing Major Source for all criteria air contaminants. The emissions units within this project have a total potential to emit which is greater than Major Modification thresholds (see table below). Therefore, the project is a significant increase and constitutes a Major Modification.

Major Modification Thresholds (Existing Major Source)					
Pollutant	**Project 1 Maximum PE** (lb/yr)	**Project 2 Maximum PE** (lb/yr)	**Total Project PE** (lb/yr)	**Threshold** (lb/year)	**Major Modification**
NOx	49,990	49,990	99,980	50,000	Y
SOx	17,210	17,210	34,420	80,000	N
PM10	62,282	62,282	124,564	30,000	Y
VOC	24,585	24,585	49,170	50,000	N

8. Federal Major Modification

District Rule 2201, Section 3.17 states that major modifications are also federal major modifications, unless they qualify for either a "Less-Than-Significant Emissions Increase" exclusion or a "Plantwide Applicability Limit" (PAL) exclusion.

The potential to emit (PE) is equal to the Net Emissions Increase (NEI calculated in the previous section). As shown below, total PE from these new emissions units exceed the Federal Major Modification thresholds for NOx and PM_{10} as shown below; therefore, this project is a Federal Major Modification for NOx and PM_{10}.

Major Modification Thresholds Significant Threshold					
Pollutant	**Project 1 Maximum PE** (lb/yr)	**Project 2 Maximum PE** (lb/yr)	**Total Project PE** (lb/yr)	**Threshold** (lb/year)	**Major Modification**
NOx	49,990	49,990	99,980	50,000	Y
SOx	17,210	17,210	34,420	80,000	N

PM10	62,282	62,282	124,564	30,000	Y
VOC	24,585	24,585	49,170	50,000	N

9. Quarterly Net Emissions Change (QNEC)

The QNEC is used to complete the emission profile for the District's PAS database. The QNEC for each unit is calculated as the difference between the quarterly PE2 and the quarterly BE, which in this project is the PE1, as discussed in VII (C)(6) above.

QNEC (lb/qtr) = [PE2 (lb/yr) – PE1(lb/yr)]/4

Option 1:

Pollutant	PE2 (lb/yr)	PE1 (lb/yr)	QNEC (lb/qtr)
NO_x	4,545	0	1,136
SO_x	1,565	0	391
PM_{10}	5,662	0	1,416
CO	13,783	0	3,446
VOC	2,235	0	559

Option 2:

Pollutant	PE2 (lb/yr)	PE1 (lb/yr)	QNEC (lb/qtr)
NO_x	5,840	0	1,460
SO_x	1,533	0	383
PM_{10}	5,548	0	1,387
CO	13,505	0	3,376
VOC	2,190	0	548

VIII.COMPLIANCE

District Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in a Major Modification.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As seen in Section VII.C.2 of this evaluation, the applicant is proposing to install steam generators with a PE greater than 2 lb/day for all air contaminants. BACT is triggered for NO_X, SOx, PM_{10}, CO and VOC since the PEs are greater than 2 lbs/day.

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered for relocation of an emissions unit with a PE > 2 lb/day.

c. Modification of emissions units – AIPE > 2 lb/day

As discussed in Section I above, there are no modified emissions units associated with this project; therefore BACT is not triggered for modification of an emissions unit with an AIPE > 2 lb/day..

d. Major Modification

As discussed in Section VII.C.7 above, this project constitutes a Major Modification for PM_{10}; therefore, BACT is triggered for PM_{10} major modification purposes.

2. BACT Guideline

Please note that BACT Guideline 1.2.1 [Steam Generator (≥ 5 MMBtu/hr, Oilfield] has been rescinded. The NO_X emission limit requirement of District Rule 4320 is lower than the Achieved-in-Practice requirement of BACT Guideline 1.2.1 (14 ppmv @ 3% O2) ; therefore a project specific BACT analysis will be performed to determine BACT for this project. More details regarding this are provided in Appendix B.

3. Top-Down BACT Analysis

Pursuant to the attached Top-Down BACT Analysis (see Appendix B), BACT has been satisfied with the following:

NO_X: 5 ppmvd @ 3% O_2 (Option 1) and 7 ppmvd @ 3% O_2 (Option 2)
SO_X: Natural gas
PM_{10}: Natural gas
CO: 25 ppmvd @ 3% O2
VOC: Gaseous fuel

B. Offsets

1. Offset Applicability

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post Project Stationary Source Potential to Emit (SSPE2) equals to or exceeds the offset threshold levels in Table 4-1 or Rule 2201.

The applicant concedes they are over the offset threshold for all five criteria air contaminants. Therefore offsets are triggered for the emissions increases associated with this project approval.

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds for all five criteria air contaminants; therefore offset calculations will be required for this project.

Per Sections 4.7.1 and 4.7.3, the quantity of offsets in pounds per year is calculated as follows for sources with an SSPE1 greater than the offset threshold levels before implementing the project being evaluated.

Offsets Required (lb/year) = $(\Sigma[PE2 - BE] + ICCE) \times DOR$, for all new or modified emissions units in the project,

Where,
PE2 = Post Project Potential to Emit, (lb/year)
BE = Baseline Emissions, (lb/year)
ICCE = Increase in Cargo Carrier Emissions, (lb/year)
DOR = Distance Offset Ratio, determined pursuant to Section 4.8

BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, Located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE)

BE = 0 for these new emissions units.

The facility is proposing to install new emissions units; therefore, Baseline Emissions are equal to zero. Also, there are no increases in cargo carrier emissions; therefore offsets can be determined as follows:

Offsets Required (lb/year) = PE2 x DOR

Aera provided two offsetting proposals, one for each option as presented below. Please note that PM10 emission increases will be offset with SOx emission reduction credits at a ratio of 1:1 consistent with Draft District Policy APR 14XX.

Option 1:

DOR = 1.0 or 1.5 Reductions (ERCs) proposed to be used for offsets in this project occurred in the Central stationary cources and within the Heavy oil western stationary source(the same stationary source). The offsets required for this project are calculated in the tables below:

Offsets required without DOR				
Pollutant	PE2 (Each steam generator)		PE2 (All 11 SG combined)	
	lb/year	lb/qtr	lb/year	lb/qtr
NOx	4,545	1,136	49,990	12,498
SOx	1,565	391	17,210	4,304
PM10	5,662	1,416	62,282	15,571
CO	13,783	3,446	151,608	37,902
VOC	2,235	559	24,585	6,146

Aera is proposing to use the following ERCs to offset the emission increases from this option.

ERC Certificate	Originally Issued to:	Location Generated	Distance Offset Ratio
S-257-2	Shell Western E & P Inc	Sec 21, T27S, R28E	1.5:1
S-0135-2	Shell Western E & P Inc	Sec 16, T27S, R28E	1.5:1
S-0133-2	Shell Western E & P Inc	Sec 29, T28S, R28E	1.5:1
S-40130321-2	Aera Energy LLC	Sec 16, T27S, R28E	1.5:1
S-1821-2	Aera Energy LLC	Sec 30, T28S, R28E	1.5:1
S-796-2	Aera Energy LLC	Sec 1 &2, T29S, R21E	1:1
S-784-2	Aera Energy LLC	Sec 18, T28S, R21E	1:1
S-2958-2	Aera Energy LLC	Sec 28, T28S, R21E	1:1
S-2395-1	Aera Energy LLC	Sec 16, T31S, R22E	1:1
S-2010-5	Aera Energy LLC	Sec 29, T28S, R28E	1.5:1
S-1825-5	Aera Energy LLC	Heavy Oil Central	1.5:1
S-1337-5	Aera Energy LLC	Central SS	1.5:1

OFFSET CALCULATIONS				
	Q1	**Q2**	**Q3**	**Q4**
Total NOx Offsets req'd (w/o DOR)	12,498	12,498	12,498	12,498
Available NOx ERCs (Central SS, 1.5:1 DOR)				
ERC S-257-2	1,508	1,272	2	2
ERC S-0135-2	5,032	1,152	0	0
ERC S-0133-2	3,203	0	0	0
ERC S-1821-2	5,454	6,771	6,946	3,638
ERC S-40130321-2	9,180	6,501	2,218	3,514
Total available NOx ERCs (Central SS)	24,377	15,696	9,166	7,154
NOx Offsets req'd at 1.5:1 DOR	18,747	18,747	18,747	18,747
NOx ERC w/drawn from NOx ERCs Central SS	18,747	15,696	9,166	7,154
Remaining NOx ERCs from Central SS after w/drawal	5,630	0	0	0
NOx offsets still req'd at 1.5:1 DOR	0	3,051	9,581	11,593
NOx offsets still req'd at 1:1 DOR	0	2,034	6,387	7,729
Available NOx ERC S-784-2 (Heavy Oil Western, 1:1 DOR)	7,140	3,993	228	0
NOx ERC w/drawn from S-784-2	0	2,034	228	0
Remaining NOx credits from ERC S-784-2	7,140	1,959	0	0
NOx offsets still req'd	0	0	6,159	7,729
NOx ERC w/drawn from Q2 to offset Q3		1,959		
Remaining ERC after w/drawal from Q2 ERC S-784-2	7,140	0	0	0
NOx offsets still req'd	0	0	4,200	7,729
Available NOx ERC S-796-2	16,403	14,218	15,065	18,484
NOx ERC w/drawn for remaining offset	0	0	4,200	7,729
Remaining NOx credits from **ERC S-796-2**	**16,403**	**14,218**	**10,865**	**10,755**
VOC offsets req'd	6,146	6,146	6,146	6,146
VOC ERC S-2395-1 (Heavy Oil Western SS, 1:1 DOR)	59,410	59,839	60,983	61,950
VOC ERCs w/drawn at 1:1 DOR	6,146	6,146	6,146	6,146
Remaining VOC credits from **ERC S-2395-1**	**53,264**	**53,693**	**54,837**	**55,804**
SOx offsets req'd (w/o DOR)	4,303	4,303	4,303	4,303

Available SOx ERC S-2010-5 (Central Heavy Oil SS)	0	3,320	0	0
Available SOx ERC S-1825-5 (Central Heavy Oil SS)	19,164	21,001	4,803	11,650
SOx offsets req'd at 1.5:1 DOR	6,455	6,455	6,455	6,455
SOx ERCs w/drawn	6,455	6,455	4,803	6,455
SOx offsets still req'd	0	0	1,652	0
Remaining SOx credits from ERC S-1825-5	12,709	17,866	0	5,195
Available SOx ERC S-1337-5	127,827	90,500	22,163	48,838
SOx ERC w/drawn from S-1337-5	0	0	1,652	0
Remaining SOx credits from S-1337-5	127,827	90,500	20,511	48,838
PM10 offsets req'd	15,571	15,571	15,571	15,571
PM10 offsets req'd at 1.5:1 DOR	23,357	23,357	23,357	23,357
SOx offsets req'd at 1:1 Interpollutant offset ratio (APR 1430)	23,357	23,357	23,357	23,357
Remaining SOx credits from ERC S-1825-5	12,709	17,866	0	5,195
SOx ERCs w/drawn from ERC S-1825-5	12,709	17,866	0	5,195
SOx offsets still req'd after using ERC S-1825-5	10,648	5,491	23,357	18,162
Remaining SOx credits from ERC S-1337-5	127,827	90,500	20,511	48,838
SOx ERCs w/drawn from ERC S-1337-5	10,648	5,491	20,511	18,162
SOx offsets req'd after using ERC S-1337-5	0	0	2,846	0
Remaining SOx credits from ERC S-1337-5	117,179	85,009	0	30,676
Use ERC S-1337-5 Q1 to offset Q3	-2,846		2,846	
Remaining SOx credits from **ERC S-1337-5**	**114,333**	**85,009**	**0**	**30,676**

As seen above, the facility has sufficient credits to fully offset the quarterly emissions increases associated with this option.

District recognizes SOx:PM10 interpollutant offset ratio of 1:1 (District's Draft APR 14XX).

Proposed Rule 2201 (offset) Conditions for Option 1 (ATCs S-1547-1162-0 through '-1172-0):

- *Annual quantity of natural gas fuel burned in this steam generator shall not exceed 745,000 MMBtu/year. {District Rule 2201}*
- *Prior to operating under this Authority to Construct, permittee shall surrender emission reduction credits for the following quantities of emissions: NOx: 1,136 lb/quarter; SOx: 391 lb/quarter; PM10: 1,416 lb/quarter and VOC: 559 lb/quarter. Offset shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 9/21/2006). [District Rule 2201]*

- *ERC Certificate Numbers S-257-2, S-0135-2, S-0133-2, S-1821-2, S-40130321-2, S-784-2, S-796-2, S-2958-2, S-2395-1, S-2010-5, S-1825-5, and S-1337-5 (or certificates split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201]*
- *Any of units S-1547-1162 through '-1180 may be installed provided that permitted annual emissions do not exceed any of the following limits: NOx: 49,990 lb/yr; SOx: 17,210 lb/yr; PM10: 62,282 lb/yr; CO: 151,608 lb/yr or VOC: 24,585 lb/yr, consistent with the quantity of ERCs identified in this project. [District Rule 2201]*

Option 2:

Since the maximum allowable emissions for this project is based on 11 steam generators with 5 ppmv NOx limit, the proposed offsetting scheme for Option 1 should be adequate to cover the emissions increases for this project.

Proposed Rule 2201 (offset) Conditions for Option 2 (ATCs S-1547-1173-0 through '-1180-0):

- *Annual quantity of natural gas fuel burned in this steam generator shall not exceed 730,000 MMBtu/year. {District Rule 2201}*
- *Prior to operating under this Authority to Construct, permittee shall surrender emission reduction credits for the following quantities of emissions: NOx: 1,460 lb/quarter; SOx: 383 lb/quarter; PM10: 1,387 lb/quarter and VOC: 548 lb/quarter. Offset shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 12/18/2008). [District Rule 2201]*
- *ERC Certificate Numbers S-257-2, S-0135-2, S-0133-2, S-1821-2, S-40130321-2, S-784-2, S-796-2, S-2958-2, S-2395-1, S-2010-5, S-1825-5, and S-1337-5 (or certificates split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201]*
- *Any of units S-1547-1162 through '-1180 may be installed provided that permitted annual emissions do not exceed any of the following limits: NOx: 49,990 lb/yr; SOx: 17,210 lb/yr; PM10: 62,282 lb/yr; CO: 151,608 lb/yr or VOC: 24,585 lb/yr, consistent with the quantity of ERCs identified in this project. [District Rule 2201]*

C. Public Notification

1. Applicability

Public noticing is required for:

a. Any new Major Source, which is a new facility that is also a Major Source,
b. Major Modifications,

c. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
d. Any project which results in the offset thresholds being surpassed, and/or
e. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Source

New Major Sources are new facilities, which are also Major Sources. Since this is not a new facility, public noticing is not required for this project for New Major Source purposes.

b. Major Modification

As demonstrated in VII.C.7, this project does constitute a Major Modification; therefore, public noticing for Major Modification purposes is required.

c. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. There are no new emissions units which will have daily emissions greater than 100 lb/day for any pollutant associated with this project; therefore, public noticing is not required.

d. Offset Threshold

The facility is already over the offset thresholds for all five criteria air contaminants; therefore this project will not result in emissions going from below the thresholds to a level above the thresholds.

Therefore public noticing is not triggered for crossing the offset thresholds

e. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant.

This project has an SSIPE > 20,000 lb/year for every pollutant except SOx. The SSIPE is compared to the SSIPE Public Notice thresholds below:

Stationary Source Increase in Permitted Emissions (SSIPE) Public Notice			
Pollutant	SSIPE ** (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO_x	49,990	20,000 lb/year	**Yes**
SO_x	17,210	20,000 lb/year	No
PM_{10}	62,282	20,000 lb/year	**Yes**

CO	151,608	20,000 lb/year	**Yes**
VOC	24,585	20,000 lb/year	**Yes**

** Maximum for the project

As demonstrated above, the SSIPEs for NOx, PM10, CO and VOC were > 20,000 lb/year; therefore, public noticing for SSIPE purposes is required

2. Public Notice Action

As discussed above, public notice will be required for this project.

D. Daily Emission Limits (DELs)

The DELs for the units are stated in the form of emission factors as shown:

- *Emissions from the natural gas-fired unit shall not exceed any of the following limits: NOx: 5 **(or 7)** ppmvd @ 3% O2 or 0.0061 lb-NOx/MMBtu; PM10: 0.0076 lb-PM10/MMBtu; CO: 25 ppmvd @ 3% O2 or 0.0185 lb-CO/MMBtu or VOC: 0.003 lb-VOC/MMBtu. [District Rules 2201 and 4320]*

- *The unit shall only be fired on natural gas with sulfur content not to exceed 0.75 gr-S/100 scf. [Rules 2201 and 4320]*

E. Compliance Assurance

1. Source Testing

The units in this project are subject to District Rule 4305, *Boilers, Steam Generators and Process Heaters, Phase 2*, District Rule 4306, *Boilers, Steam Generators and Process Heaters, Phase 3, and District Rule 4320, Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5 MMBtu/hr.* Source testing requirements will be discussed in the compliance review section of this evaluation.

2. Monitoring

As required by District Rules 4305, 4306 and 4320, the units are subject to monitoring requirements. Monitoring requirements, in accordance with District Rules will be discussed in the compliance review section of this evaluation.

3. Recordkeeping

As required by District Rules 4305, 4306 and 4320, the units are subject to recordkeeping requirements. Recordkeeping requirements, in accordance with District Rules will be discussed in the compliance review of this evaluation.

The following permit condition will be listed on permit as follows:

- *All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 4305, 4306 and 4320]*

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis

Section 4.14.1 of this Rule requires that an ambient air quality analysis (AAQA) be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The Technical Services Division of the SJVAPCD conducted the required analysis. Refer to Appendix D of this document for the AAQA summary sheet.

The results from the Criteria Pollutant Modeling for bothe options are shown as follows:

Criteria Pollutant Modeling Results*

	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	Pass	X	Pass	X	X
NO_x	Pass	X	X	X	Pass
SO_x	Pass	Pass	X	Pass	Pass
PM_{10}	X	X	X	Pass[1]	Pass[1]

*Results were taken from the attached PSD spreadsheet.
[1]The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

The threshold for PM10 was reached in the scenario described above with the following results:

PM_{10} Pollutant Modeling Results*
Values are in $\mu g/m^3$

Category	24 Hours	Annual
Proposed	5.03	0.78
Significance Level	5.0	1.0
Result	Pass	Pass

The associated PM10 daily emission limits are listed in the proposed permit conditions section. No limits were necessary for locations associated with stacks 1 and 2.

The emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS, if compliance with the proposed conditions in the ATCs is maintained.

G. Federal Major Modification Certification of Compliance

The compliance certification is required for any project, which constitutes a New Major Source or a Federal Major Modification.

Section 4.15.2 of this Rule requires the owner of a new Major Source or a source undergoing a Federal Major Modification to demonstrate to the satisfaction of the District that all other Major Sources owned by such person and operating in California are in compliance or are on a schedule for compliance with all applicable emission limitations and standards. As discussed in Sections VII-C.8, this project constitutes a Federal Major Modification, therefore this requirement is applicable. Included in Appendix C is Aera's compliance certification.

District Rule 2520 Federally Mandated Operating Permits

This facility is subject to this Rule, and has received their Title V Operating Permit. The proposed modification may be considered a significant modification to the Title V Permit. As discussed above, the facility has applied for a Certificate of Conformity (COC); therefore, the facility must apply to modify their Title V permit with an administrative amendment/minor modification, prior to operating with the proposed modifications. Aera's Title V compliance certification form is included in Appendix C. The following permit conditions will be listed to ensure compliance:

- *{1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]*
- *{1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]*

District Rule 4001 New Source Performance Standards

40 CFR Part 60, Subpart Dc applies to Small Industrial-Commercial-Industrial Steam Generators between 10 MMBtu/hr and 100 MMBtu/hr (post-6/9/89 construction, modification or, reconstruction).

The subject steam generators have a rating of 85 MMBtu/hr and are fired on natural gas. Subpart Dc has no standards for gas-fired steam generators. Therefore, the subject steam generators are not affected facilities and subpart Dc does not apply.

District Rule 4101 Visible Emissions

District Rule 4101, Section 5.0, indicates that no air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour, which is dark or darker than Ringlemann 1 or equivalent to 20% opacity.

Gas-fired equipment typically operates without visible emissions. Compliance with District Rule 4101 is expected.

District Rule 4102 Nuisance

Section 4.0 prohibits discharge of air contaminants, which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected.

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 - Risk Management Policy for Permitting New and Modified Sources specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

An HRA is not required for a project with a total facility prioritization score ≤ one. According to the Technical Services Memo for both options of this project (Appendix D), the total prioritization score for each option in this project were less than or equal to one. Therefore, no future analysis is required to determine the impact from this project and compliance with the District's Risk Management Policy is expected.

Option 1:

RMR Summary				
Categories	**Steam Gen (Unit 1162-0 thru 1172-0)**		**Project Totals for 11 units**	**Facility Totals**
Prioritization Score	0.0		0.007	>1
Acute Hazard Index	N/A [1]		N/A [1]	0.1 [2]
Chronic Hazard Index	N/A [1]		N/A [1]	0.0 [2]
Maximum Individual Cancer Risk (10^{-6})	N/A [1]		N/A [1]	1.6 [2]
T-BACT Required?	No			
Special Permit Conditions?	No			

[1] Even though the facility prioritization score was greater than one, no further analysis is required since the prioritization score for the project was insignificant (<0.05).

[2] Facility totals are maintained in the AERA Cumulative Risk document at G:\PER\TOXIC\SCREEN\DATA\SOUTH\1547 Aera Energy

Option 2:

RMR Summary				
Categories	**Steam Gen (Unit 1173-0 thru 1180-0)**		**Project Totals for 8 units**	**Facility Totals**
Prioritization Score	0.0		0.005	>1
Acute Hazard Index	N/A [1]		N/A [1]	0.1 [2]

Chronic Hazard Index	N/A [1]		N/A [1]	0.0 [2]
Maximum Individual Cancer Risk (10^{-6})	N/A [1]		N/A [1]	1.6 [2]
T-BACT Required?	No			
Special Permit Conditions?	No			

[1] Even though the facility prioritization score was greater than one, no further analysis is required since the prioritization score for the project was insignificant (<0.05).

[2] Facility totals are maintained in the AERA Cumulative Risk document at G:\PER\TOXIC\SCREEN\DATA\SOUTH\1547 Aera Energy

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 10 in a million). As outlined by the HRA Summaries in Appendix D of this report, the emissions increases for this project was determined to be less than significant. However, to ensure that human health risks will not exceed District allowable levels, the following permit conditions will be included in the ATCs for both options:

- *The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap, roof overhang, or any other obstruction. [District Rule 4102]*
- *The total PM10 emissions from Units S-1547-1162-0 though '-1180-0 shall not exceed 124 lb/day at location #2038 in the SW/4 of Section 20, T28S, R21E. [District Rule 4102]*
- *The total PM10 emissions from Units S-1547-1162 through '-1180-0 shall not exceed 168 lb/day at location #2972 in the SE/4 of Section 29, T28S, R21E. [District Rule 4102]*
- *Permittee shall maintain records of daily PM10 emissions from Units S-1547-1162-0 through S-1547-1180-0 at locations #2038 and #2972. [District Rule 4102]*

District Rule 4201 Particulate Matter Concentration

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

F-Factor for NG: 8,578 dscf/MMBtu at 60 °F
PM_{10} Emission Factor: 0.0076 lb-PM_{10}/MMBtu
Percentage of PM as PM_{10} in Exhaust: 100%
Exhaust Oxygen (O_2) Concentration: 3%

Excess Air Correction to F Factor = $\frac{20.9}{(20.9 - 3)} = 1.17$

$$GL = \left(\frac{0.0076\ lb - PM}{MMBtu} \times \frac{7{,}000\ grain}{lb - PM} \right) / \left(\frac{8{,}578\ ft^3}{MMBtu} \times 1.17 \right)$$

$$GL = 0.0053\ grain/dscf < 0.1\ grain/dscf$$

Therefore, compliance with District Rule 4201 requirements is expected and a permit condition will be listed on the permit as follows:

- *Particulate matter emissions shall not exceed 0.1 grain/dscf at operating conditions, nor 0.1 grain/dscf calculated to 12% CO2, nor 10 lb/hr. [District Rule 4201 and District Rule 4301, 5.1 and 5.2.3]*

District Rule 4301 Fuel Burning Equipment

This rule specifies maximum emission rates in lb/hr for SO_2, NO_2, and combustion contaminants (defined as total PM in Rule 1020). This rule also limits combustion contaminants to ≤ 0.1 gr/scf. According to AP 42 (Table 1.4-2, footnote c), all PM emissions from natural gas combustion are less than 1 μm in diameter.

The maximum emission rates in lb/hr for each of the steam generator in this project are as follows:

Option 1:

District Rule 4301 Limits (lb/hr)			
Unit	NO_2	Total PM	SO_2
Each steam generator	0.5	0.6	0.2
Rule Limit (lb/hr)	**140**	**10**	**200**

Option 2:

District Rule 4301 Limits (lb/hr)			
Unit	NO_2	Total PM	SO_2
Each steam generator	0.7	0.6	0.2
Rule Limit (lb/hr)	**140**	**10**	**200**

The above table indicates compliance with the maximum lb/hr emissions in this rule; therefore, continued compliance is expected.

District Rule 4305 Boilers, Steam Generators and Process Heaters – Phase 2

The proposed steam generators are natural gas-fired with a maximum heat input of 85.0 MMBtu/hr each. Pursuant to Section 2.0 of District Rule 4305, the units are subject to District Rule 4305, *Boilers, Steam Generators and Process Heaters – Phase 2.*

In addition, the units are also subject to District Rule 4306, *Boilers, Steam Generators and Process Heaters – Phase 3* and Rule 3420, *Advanced Emission Reduction Options for Boilers, Steam Generators and Process Heaters Greater than 5 MMBtu/hr.*

Since emissions limits of District Rule 4320 and all other requirements are equivalent or more stringent than District Rule 4305 requirements, compliance with District Rule 4320 requirements will satisfy requirements of District Rule 4305.

District Rule 4306 Boilers, Steam Generators and Process Heaters – Phase 3

The proposed steam generators are natural gas-fired with a maximum heat input of 85.0 MMBtu/hr each. Pursuant to Section 2.0 of District Rule 4306, the units are subject to District Rule 4306, *Boilers, Steam Generators and Process Heaters – Phase 3.*

In addition, the units are also subject to District Rule 4320, *Advanced Emission Reduction Options for Boilers, Steam Generators and Process Heaters Greater than 5 MMBtu/hr*

Since emissions limits of District Rule 4320 and all other requirements are equivalent or more stringent than District Rule 4306 requirements, compliance with District Rule 4320 requirements will satisfy requirements of District Rule 4306.

District Rule 4320 Advanced Emission Reduction Options for Boilers, Steam Generators and Process Heaters Greater than 5 MMBtu/hr

This rule limits NOx, CO, SO2 and PM10 emissions from boilers, steam generators and process heaters rated greater than 5 MMBtu/hr. This rule also provides a compliance option of payment of fees in proportion to the actual amount of NOx emitted over the previous year.

The units in this project are all rated at greater than 5 MMBtu/hr heat input and are subject to this rule.

Section 5.1 NOx Emission Limits

Section 5.1 states that an operator of a unit(s) subject to this rule shall comply with all applicable requirements of the rule and one of the following, on a unit-by-unit basis:

5.1.1 Operate the unit to comply with the emission limits specified in Sections 5.2 and 5.4; or
5.1.2 Pay an annual emissions fee to the District as specified in Section 5.3 and comply with the control requirements specified in Section 5.4; or
5.1.3 Comply with the applicable Low-use Unit requirements of Section 5.5.

Section 5.2.1 states that on and after the indicated Compliance Deadline, units shall not be operated in a manner which exceeds the applicable NOx limit specified in Table 1 of this rule, shown below. On and after October 1, 2008, units shall not be operated in a manner to which exceeds a carbon dioxide (CO) emissions limit of 400 ppmv.

Rule 4320 NOx Emission Limits			
C. Oilfield Steam Generators	**NOx Limit**	**Authority to Construct**	**Compliance Deadline**
2. Units with a total rated heat input >20 MMBtu/hr	a) Standard Schedule 7 ppmv or 0.008 b/MMBtu; or	July 1, 2009	July 1, 2010
	b) Staged Enhanced Schedule Initial Limit 9 ppmv or 0.011 lb/MMBtu; and	July 1, 2011	July 1, 2012
	Final Limit 5 ppmv or 0.0062lb/MMBtu	January 1, 2013	January 1, 2014
3. Units firing on less than 50% by volume, PUC quality gas	Staged Enhanced Schedule Initial Limit 12ppmv or 0.014 lb/MMBtu; and	July 1, 2010	July 1, 2011
	Final Limit 9 ppmv or 0.011 lb/MMBtu	January 1, 2013	January 1, 2014

For the subject steam generators, Aera is proposing to comply with Category C2 – standard schedule (7 ppmv) and final limit (5 ppmv calculated at 0.0061 lb/MMBtu not 0.0062 lb/MMBtu).

- The proposed NOx emission factor is 5 ppmvd @ 3% O2 or (0.0061 lb/MMBtu) for Option 1 and 7 ppmvd @ 3% O2 (0.008 lb/MMBtu)
- The proposed CO emission factor is 25 ppmvd @ 3% O2 or 0.0021 lb/MMBtu.

Compliance with the rule emission requirements is expected.

Section 5.2.4 applies to units firing on a combination of gaseous and liquid fuels. Aera is not proposing to fire on liquid fuels.

Section 5.4 Particulate Matter Control Requirements

Section 5.4.1 states that to limit particulate matter emissions, an operator shall comply with one of the options listed in the rule.

Section 5.4.1.1 provides option for the operator to comply with the rule by firing the unit exclusively on PUC-quality gas, commercial propane, butane, or liquefied petroleum gas, or a combination of such gases;

Section 5.4.1.2 provides option for the operator to comply with the rule by limiting the fuel sulfur content to no more than five (5) grains of total sulfur per hundred (100) standard cubic feet.

Section 5.4.1.3 provides option for the operator to comply with the rule by installing and properly operating an emissions control system that reduces SO2 emissions by at least 95% by weight; or limit exhaust SO2 to less than or equal to 9 ppmv corrected to 3 % O2.

The steam generators will be fired on PUC or FERC naturalgas. Aera will have a fuel sulfur content limit of 0.75 gr S/100 scf. The ATCs will have conditions specifying these limits to ensure compliance with this section of the rule.

Section 5.5 Low-Use Unit

This section discusses the requirements of low-use units. Aera is not requesting low-use status; therefore, this section of the rule is not applicable to this project.

Section 5.6 Startup and Shutdown Provisions

Section 5.6 states that on and after the full compliance deadline specified in Section 5.0, the applicable emission limits of Sections 5.2, Table 1 and 5.5.2 shall not apply during start-up or shutdown provided an operator complies with the requirements specified in Sections 5.6.1 through 5.6.5.

Aera has requested startup, shutdown and refractory curing provisions for these steam generators, consistent with past District approvals. The following conditions will be placed on the permits:

- *Duration of start-up and shutdown shall not exceed 2 hours each per occurance. [District Rules 4305, 4306 and 4320]*

- *Duration of refractory curing shall not exceed 30 hours per each occurance. Permittee shall keep accurate records of refractory curing duration and make records readily available to the District upon request. [District Rules 4305, 4306 and 4320]*

- *Emission rates during startup, shutdown and refractory curing shall not exceed: particulate matter - 10 pounds per hour, or 0.1 grains/dscf calculated to 12% CO2; sulfur - 200 pounds of SO2 per hour, or 2000 ppmv as SO2, or 0.11 pounds sulfur (as S) per MMBtu on average-wide basis for all units in Rule 4406 plan; NO2 - 140 pounds per hour or 0.14 pounds per MMBtu. [District Rules 4101, 4102, 4301, 4405, 4406 and 4801] Y*

Section 5.7 Monitoring Provisions

Section 5.7.1 requires that permit units subject to District Rule 4320, Section 5.2 shall either install and maintain an operational APCO approved Continuous Emission Monitoring

System (CEMS) for NO_X, CO and O_2, or implement an APCO-approved alternate monitoring.

Aera has proposed to implement Alternate Monitoring Scheme A or H (pursuant to District Policy SSP-1105), which requires periodic monitoring of NO_X, CO, O_2 and ammonia slip emissions concentrations for units equipped with selective catalytic reduction (SCR). The following conditions will be placed in the ATCs to ensure compliance with the requirements of this alternate monitoring plan **(NH_3 monitoring will only be for the units with SCR):**

- *{2395} The permittee shall monitor and record the stack concentration of NO_X, CO, and O2 at least once every month (in which a source test is not performed) using a portable analyzer that meets District specifications. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last month. [District Rules 4305, 4306, and 4320]*

- *The permittee shall monitor and record the stack concentration of NH_3 at least once during each month in which a source test is not performed. NH_3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation; i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within one day of restarting the unit unless monitoring has been performed within the last month. [District Rules 4305, 4306 and 4320]*

- *If the NOx or CO concentrations corrected to 3%, as measured by the portable analyzer, or the NH_3 concentrations corrected to 3% O_2, as measured by District approved gas-detection tubes, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. [District Rules 4102, 4305, 4306 and 4320]*

- *All NOx, CO, O2 and NH3 emission readings shall be taken with the unit operating at either at conditions representative of normal operations or conditions specified in the Permit to Operate. The NOx, CO, and O2 analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and ecommendations or a protocol approved by the APCO. NH_3 emission readings shall be measured in accordance with the gas sample tube manufacturer's specifications and recommendations. Emission readings taken shall be averaged over a 15 consecutive-minute sample period by either taking a cumulative 15 consecutive-minute sample*

reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive minute period. [District Rules 4102, 4305, 4306 and 4320]

- *The permittee shall maintain records of: (1) the date and time of NO_X, CO, O_2 and NH_3 measurements, (2) the O_2 concentration in percent by volume and the measured NOx, CO and NH_3 concentrations corrected to 3% O_2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) method of determining the NH_3 concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 4305, 4306 and 4320]*

- *Ammonia emissions eadings shall be conducted at the time the NOx, CO and O_2 readings are taken. The readings shall be converted to ppmvd @ 3% O_2. [District Rules 4305, 4306 and 4320]*

Section 5.7.6 requires monitoring SOx emissions. The following condition will be placed in the ATCs to be in compliance with this rule requirement:

- *PUC quality natural gas is any gaseous fuel where the sulfur content is no more than one-fourth (0.25) grain of hydrogen sulfide per one hundred (100) standard cubic feet, no more than five (5) grains of total sulfur per one hundred (100) standard cubic feet, and at least 80% methane by volume. [District Rule 4320]*

- *If the steam generator is not fired on PUC-regulated natural gas and compliance is achieved through fuel sulfur content limitations, then the sulfur content of the fuel shall be determined by testing sulfur content at a location after all fuel sources are combined prior to incineration, or by performing mass balance calculations based on monitoring the sulfur content and volume of each fuel source. The sulfur content of the fuel shall be determined using the test methods referenced in this permit. [District Rule 4320]*

- *When complying with sulfur emission limits by fuel analysis or by a combination of source testing and fuel analysis, permittee shall demonstrate compliance at least annually. [District Rule 4320]*

- *If the unit is fired on PUC-regulated natural gas, valid purchase contracts, supplier certifications, tariff sheets, or transportation contracts may be used to satisfy the fuel sulfur content analysis, provided they establish the fuel sulfur concentration and higher heating value. [District Rule 4320]*

Section 5.8 Compliance Determination

Section 5.8.1 requires that the operator of any unit have the option of complying with either the applicable heat input (lb/MMBtu), emission limits or the concentration (ppmv) emission limits specified in Section 5.2. The emission limits selected to demonstrate compliance shall be specified in the source test proposal pursuant to Rule 1081 (Source Sampling). Therefore, the following condition will be retained or listed on the ATCs as follows:

- *{2976} The source plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 4305, 4306 and 4320]*

Section 5.8.2 requires that all emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. Unless otherwise specified in the Permit to Operate, no determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0. Therefore, the following permit condition will be listed on the ATCs as follows:

- *{2972} All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. Unless otherwise specified in the Permit to Operate, no determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4320. For the purposes of permittee-performed alternate monitoring, emissions measurements may be performed at any time after the unit reaches conditions representative of normal operation. [District Rules 4305, 4306 and 4320]*

- *Shorter time periods for demonstration of compliance after stratup or re-ignition may be approved by the APCO by submittal of appropriate technical justification upon implemetation of this ATC. [District Rule 2201]*

Section 5.8.4 requires that for emissions monitoring pursuant to Sections 5.7.1 and 6.3.1 using a portable NO_X analyzer as part of an APCO approved Alternate Emissions Monitoring System, emission readings shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15-consecutive-minute sample reading or by taking at least five (5) readings evenly spaced out over the 15-consecutive-minute period. Therefore, the following previously listed permit condition will be on the ATCs as follows:

- *{2937} All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 4305, 4306 and 4320]*

Section 5.8.5 requires that for emissions source testing performed pursuant to Section 6.3.1 for the purpose of determining compliance with an applicable standard or numerical limitation of this rule, the arithmetic average of three (3) 30-consecutive-minute test runs shall apply. If two (2) of three (3) runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. Therefore, the following permit condition will be listed on the permit as follows:

- *{2980} For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 4305, 4306 and 4320]*

Section 6.1 Recordkeeping

Section 6.1 requires that the records required by Sections 6.1.1 through 6.1.5 shall be maintained for five calendar years and shall be made available to the APCO and EPA upon request. Failure to maintain records or information contained in the records that demonstrate noncompliance with the applicable requirements of this rule shall constitute a violation of this rule.

The condiiton on start-up and shutdown record keeping conditions shall be retaine din the ATCs to ensure Aera's compliance with this section of the rule.

Section 6.2, Test Methods

Section 6.2 identifies test methods to be used when determining compliance with the rule. The following existing permit conditions will be retained on the ATCs:

- *{109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]*

- *The following test methods shall be used: NO_X (ppmv) - EPA Method 7E or ARB Method 100, NOx (lb/MMBtu) - EPA Method 19; CO (ppmv) - EPA Method 10 or ARB Method 100; Stack gas oxygen (O_2) - EPA Method 3 or 3A or ARB Method 100; stack gas velocities – EPA Method 2; Stack gas moisture content – EPA Method 4; SOx – EPA Method 6C or 8 or ARB Method 100; fuel gas sulfur as H2S content – EPA Method 11 or 15; and fuel hhv (MMBtu) –ASTM D 1826* or D 1945 in conjunction with ASTM D 3588. *[District Rules 4305, 4306 and 4320]*

Section 6.3, Compliance Testing

Section 6.3.1 requires that each unit subject to the requirements in Section 5.2 shall be source tested at least once every 12 months, except if two consecutive annual source tests demonstrate compliance, source testing may be performed every 36 months. If such a source test demonstrates non-compliance, source testing shall revert to every 12 months. The following conditions will be included in the appropriate ATCs:

- *A source test to demonstrate compliance with NOx and CO emission limits shall be performed within 60 days of startup of this unit. [District Rules 2201 and 4320]*

- *Source testing to measure natural gas-combustion NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months (no more than 30 days before or after the required annual source test date). After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months (no more than 30 days before or after the required 36-month source test date). If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201 and 4320]*

- *{110} The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]*

Section 6.3.1.2 specifies tune-up requirements. Aera will use pre-approved Alternate Monitoring Scheme "A" or "H" using a portable analyzer. Therefore the tune-up requirements listed in Section 6.3.1.2 are not applicable. This section also requires, that during the 36-month source testing interval, the owner/operator shall monitor monthly the operational characteristics recommended by the unit manufacturer. Since the pre-approved alternate monitoring requires monthly monitoring of NOx, CO and O2 exhaust emission concentrations using a portable analyzer, the operational characteristics monitoring requirements is satisfied.

Conclusion

Conditions will be incorporated into the ATCs in order to ensure compliance with each section of this rule, see attached draft ATCs. Therefore, compliance with District Rule 4320 requirements is expected.

District Rule 4351 Boilers, Steam Generators and Process Heaters – Phase 1

This rule applies to boilers, steam generators, and process heaters at NO_x Major Sources that are not located west of Interstate 5 in Fresno, Kings, or Kern counties. The steam generators are located within the Heavy Oil Western stationary source. The units in this project are located west of I-5; therefore, the provisions of this rule do not apply.

District Rule 4801 Sulfur Compounds

A person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge: 0.2 % by volume calculated as SO_2, on a dry basis averaged over 15 consecutive minutes.

Using the ideal gas equation and the emission factors presented in Section VII, the sulfur compound emissions are calculated as follows:

Volume $SO_2 = \frac{n\,RT}{P}$

With:

N = moles SO_2
T (Standard Temperature) = 60°F = 520°R
P (Standard Pressure) = 14.7 psi
R (Universal Gas Constant) = $\frac{10.73\,psi \cdot ft^3}{lb \cdot mol \cdot °R}$

$$\frac{0.0021\,lb-SOx}{MMBtu} \times \frac{MMBtu}{8{,}578\,dscf} \times \frac{1\,lb \cdot mol}{64\,lb} \times \frac{10.73\,psi \cdot ft^3}{lb \cdot mol \cdot °R} \times \frac{520°R}{14.7\,psi} \times \frac{1{,}000{,}000 \cdot parts}{million} = 1.45\frac{parts}{million}$$

$$SulfurConcentration = 1.45 \frac{parts}{million} < 2{,}000 \text{ ppmv (or 0.2\%)}$$

Therefore, compliance with District Rule 4801 requirements is expected.

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

The District determined that no other agency has broader discretionary approval power over the project and that the District is the first agency to act on the project, therefore establishing the District as the Lead Agency for the project (CEQA Guidelines §15051(b). The District's engineering evaluation of the project (this document) determined that compliance with District rules and permit conditions would reduce and mitigate the project's potential air quality impacts to less than significant.

An Initial Study is being prepared, to determine if the project may have a significant effect on the environment. A Negative Declaration or Mitigated Negative Declaration will be prepared if there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment. Otherwise, an Environmental Impact Report will be prepared. The public review period will not be less than 20-days for a Negative or Mitigated Negative Declaration and not less than 30-days for an EIR (CCR §15105)

The issuance of the Authority to Construct (ATC) constitutes the final decision to approve the project and will not be issued until the District has certified the final environmental assessment. Pursuant to CEQA Guidelines §15075 a Notice of Determination will be filed within five (5) days of the issuance of the ATC.

IX. RECOMMENDATION

Compliance with all applicable rules and regulations is expected. Issue the ATCs listed below subject to the permit conditions on the attached draft Authorities to Construct in Appendix F.

X. BILLING INFORMATION

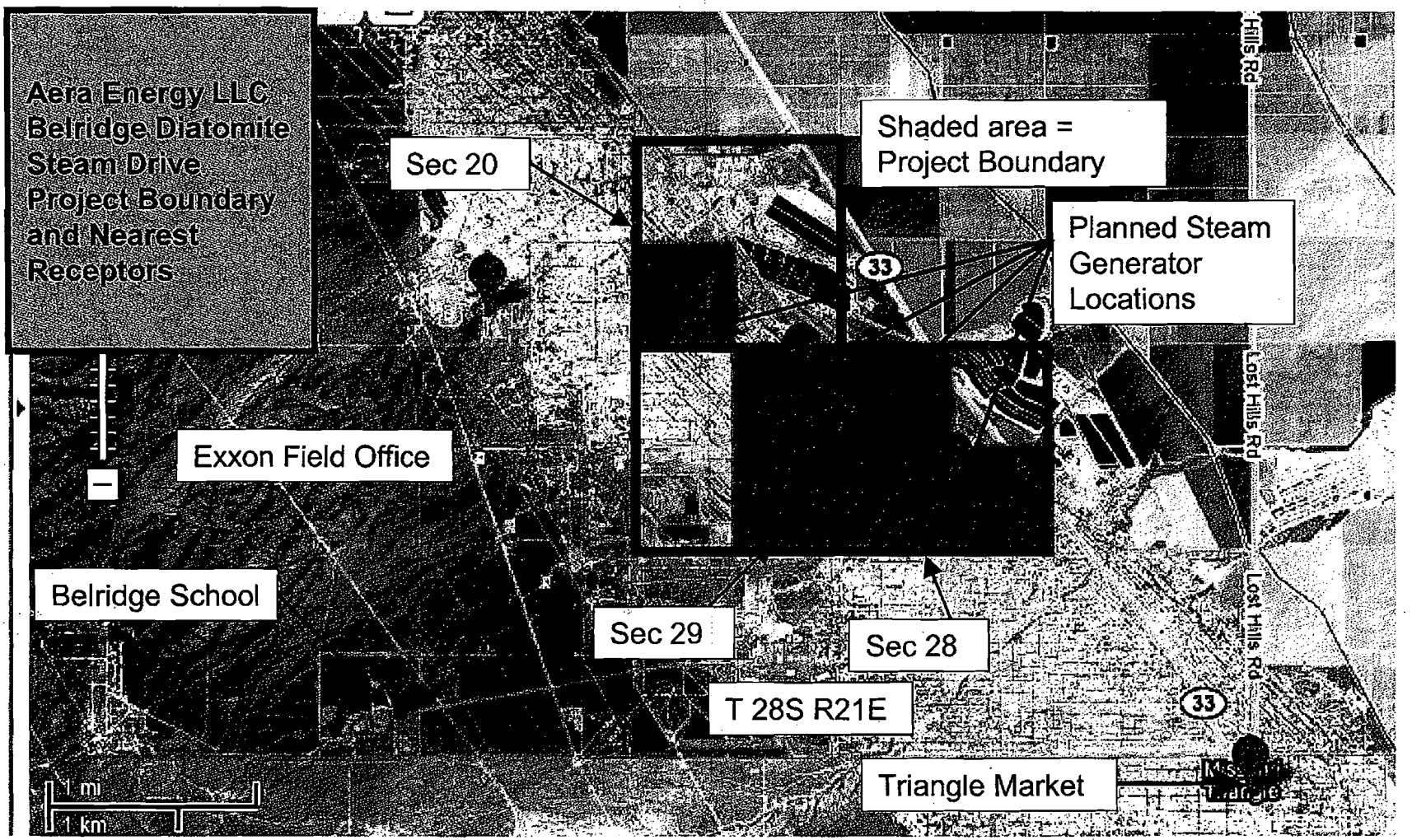
Annual Permit Fees			
Permit Number	**Fee Schedule**	**Fee Description**	**Annual Fee**
All units	3020-02-H	85 MMBtu/hr	$1,030.00 ea

APPENDICES

A: Map of Project Area
B: BACT Guideline & Top-Down BACT Analysis
C: Compliance Certifications
D: RMR and AAQA Summaries
E: BPS for CEQA-GHG Compliance
F: Draft ATCs

APPENDIX A

Map of Project Area


Aera Energy LLC
Belridge Diatomite
Steam Drive
Project Boundary
and Nearest
Receptors
Sec 20
Shaded area =
Project Boundary
Planned Steam
Generator
Locations
Exxon Field Office
Belridge School
Sec 29
Sec 28
T 28S R21E
Triangle Market
Lost Hills Rd
Lost Hills Rd
Hills Rd
33
33
1 mi
1 km

APPENDIX B

BACT Guideline and Top Down BACTAnalysis

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 1.2.1*

Last Update: 3/11/2005

Steam Generator (> or = 5 MMBtu/hr, Oil Field)

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
CO	50 ppmvd @ 3% O2		
NOx	14 ppmvd @ 3% O2	7 ppmvd @ 3% O2 with SCR 9 ppmvd @ 3% O2	
PM10	Natural gas, LPG, waste gas treated to remove 95% by weight of sulfur compounds or treated such that the sulfur content does not exceed 1 gr of sulfur compounds (as S) per 100 scf, or use of a continuously operating SO2 scrubber and either achieving 95% by weight control of sulfur compounds or achieving an emission rate of 30 ppmvd SO2 at stack O2		
SOx	Natural gas, LPG, waste gas treated to remove 95% by weight of sulfur compounds or treated such that the sulfur content does not exceed 1 gr of sulfur compounds (as S) per 100 scf, or use of a continuously operating SO2 scrubber and either achieving 95% by weight control of sulfur compounds or achieving an emission rate of 30 ppmvd SO2 at stack O2		
VOC	Gaseous fuel		

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in s a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is requried for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This Is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

Option 1: Top Down BACT Analysis

Top Down BACT Analysis for NOx Emissions:

Step 1 - Identify All Possible Control Technologies

The District adopted District Rule 4320 on October 16, 2008. The NO_X emission limit requirements in District Rule 4320 are lower than the current BACT limits listed in BACT Guideline 1.2.1; therefore a project specific BACT analysis will be performed to determine BACT for this project. District Rule 4320 includes a compliance option that limits oilfield steam generators with heat input ratings > 20.0 MMBtu/hr to 7 ppm @ 3% O_2. This emission limit is Achieved in Practice control technology for the BACT analysis. District Rule 4320 also contains an enhanced schedule with initial and final limit options that allows applicants additional time to meet the requirements of the rule. The enhanced schedule NO_X emission initial limit requirement is 9 ppmv @ 3% O_2 and final limit of 5 ppmv @ 3% O_2. Since this is an enhanced option in the rule, the final limit of 5 ppmv @ 3% O_2 will be considered the Technologically Feasible control technology for the BACT analysis.

The SJVUAPCD BACT Clearinghouse Guideline 1.2.1 has been rescinded. Therefore a new BACT analysis is required. The following are possible control technologies:

1. 7 ppmvd @ 3% O2 - Achieved in Practice.
2. 5 ppmvd @ 3% O2 - Technologically Feasible

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. 7 ppmvd @ 3% O2 - Achieved in Practice.
2. 5 ppmvd @ 3% O2 - Technologically Feasible

Step 4 - Cost Effectiveness Analysis

Applicant has proposed the technologically feasible from Step 1. Therefore a cost analysis is not required.

Step 5 – Select BACT for NOx

5 ppmv @ 3% O2 with SCR is proposed by the applicant

Top Down BACT Analysis for VOC Emissions:

Step 1 - Identify all control technologies

The SJVUAPCD BACT Clearinghouse guideline 1.2.1, 3rd quarter 2010, identifies achieved in practice and technologically feasible BACT for Steam Generator $\geq$ 5 MMbtu/hr, at an oil field as follows:

1. Gaseous fuel - achieved in practice

Step 2 - Eliminate Technologically Infeasible Options

The above listed technology is technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. Gaseous fuel - achieved in practice

Step 4 - Cost Effectiveness Analysis

Only one control technology identified and this technology is achieved in practice, therefore, cost effectiveness analysis not necessary.

Step 5 - Select BACT for VOC

The use of gaseous fuel (natural gas) is selected as BACT for VOC emissions.

Top Down BACT Analysis for PM_{10} and SOx Emissions:

Step 1 - Identify all control technologies

The SJVUAPCD BACT Clearinghouse guideline 1.2.1, 3rd quarter 2010, identifies achieved in practice and technologically feasible BACT for Steam Generator $\geq$ 5 MMbtu/hr, at an oil field as follows:

1. Natural gas, LPG, waste gas treated to remove 95% by weight of sulfur compounds or treated such that the sulfur content does not exceed 1 gr of sulfur compounds (as S) per 100 scf, or use of a continuously operating SO2 scrubber and either achieving 95% by weight control of sulfur compounds or achieving an emission rate of 30 ppmvd SO2 at stack O2 - achieved in practice

Step 2 - Eliminate Technologically Infeasible Options

The above listed technology is technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. Natural gas, LPG, waste gas treated to remove 95% by weight of sulfur compounds or treated such that the sulfur content does not exceed 1 gr of sulfur compounds (as S) per 100 scf, or use of a continuously operating SO2 scrubber and either achieving 95% by weight control of sulfur compounds or achieving an emission rate of 30 ppmvd SO2 at stack O2 - achieved in practice

Step 4 - Cost Effectiveness Analysis

Only one control technology identified and this technology is achieved in practice, therefore, cost effectiveness analysis not necessary.

Step 5 - Select BACT for SOx and PM10

The use of natural gas as a primary fuel with a sulfur content not to exceed 0.75 gr-S/100 scf with no back up fuel is selected as BACT for SOx and PM_{10} emissions.

Top Down BACT Analysis for CO Emissions:

Step 1 - Identify all control technologies

The SJVUAPCD BACT Clearinghouse guideline 1.2.1, 3rd quarter 2010, identifies achieved in practice and technologically feasible BACT for Steam Generator $\geq$ 5 MMbtu/hr, at an oil field as follows:

1. 50 ppmvd @ 3% O2 - achieved in practice

Step 2 - Eliminate Technologically Infeasible Options

The above listed technology is technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. 50 ppmvd @ 3% O2 - achieved in practice

Step 4 - Cost Effectiveness Analysis

Only one control technology identified and this technology is achieved in practice, therefore, cost effectiveness analysis not necessary.

Step 5 - Select BACT for CO

25 ppmvd CO @ 3% O2 is proposed and satisfies BACT for CO emissions.

Option 2: Top Down BACT Analysis

Top Down BACT Analysis for NOx Emissions:

Step 1 - Identify All Possible Control Technologies

The District adopted District Rule 4320 on October 16, 2008. The NO_X emission limit requirements in District Rule 4320 are lower than the current BACT limits listed in BACT Guideline 1.2.1; therefore a project specific BACT analysis will be performed to determine BACT for this project. District Rule 4320 includes a compliance option that limits oilfield steam generators with heat input ratings > 20.0 MMBtu/hr to 7 ppm @ 3% O_2. This emission limit is Achieved in Practice control technology for the BACT analysis. District Rule 4320 also contains an enhanced schedule with initial and final limit options that allows applicants additional time to meet the requirements of the rule. The enhanced schedule NO_X emission initial limit requirement is 9 ppmv @ 3% O_2 and final limit of 5 ppmv @ 3% O_2. Since this is an enhanced option in the rule, the final limit of 5 ppmv @ 3% O_2 will be considered the Technologically Feasible control technology for the BACT analysis.

The SJVUAPCD BACT Clearinghouse Guideline 1.2.1 has been rescinded. Therefore, a new BACT analysis is required. The following are possible control technologies:

3. 5 ppmvd @ 3% O2 - Technologically Feasible
4. 7 ppmvd @ 3% O2 - Achieved in Practice

Step 2 - Eliminate Technologically Infeasible Options

None of the above listed technologies are technologically infeasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

1. 5 ppmvd @ 3% O2 - Technologically Feasible
2. 7 ppmvd @ 3% O2 - Achieved in Practice

Step 4 - Cost Effectiveness Analysis

The applicant has proposed a NOx limit of 7 ppmvd @ 3% O_2, therefore a cost analysis for the 5 ppmvd (SCR) opetion is required.

SCR Cost Effective Analysis:

Assumptions:

- Industry standard (IS) is assumed to be a NOx emission rate of 15 ppmv @3% O2 in accordance with Rule 4306
- Unit's maximum emissions are defined by the burner size multiplied by the emissions rate and a maximum annual operating schedule of 8,760 hours

Calculations:

Industry Std NOx Emissions = 85 MMBtu/hr x 0.018 lb/MMBtu x 8,760 hr/yr
= 13,403 lb/yr

Feasible NOx Emissions = 85 MMBtu/hr x 0.0062 lb/MMBtu x 8,760 hr/yr
= 4,617 lb/yr

NOx reduction due to SCR:

Total reduction = Emissions $_{(15\ ppmv)}$ – Emissions $_{(5\ ppmv)}$
Total reduction = 13, 403 lb/yr – 4,617 lb/yr
Total reduction = 8,786 lb/yr = 4.39 ton/yr

SCR Capital Cost (SCR Vendor & TJ Cross, provided for Project S-1084509): $1,102,046.00 (includes all purchased equipment, taxes, freight and installation of SCR for a 62.5 MMBtu/hr unit) – detailed cost follow/attached.

Equivalent Annual Capital Cost (CC):

$$A = (P)\left[\frac{(i)(1+i)^n}{(1+i)^n - 1}\right] \text{ where:}$$

A: Equivalent annual capital cost of the control equipment
P: Present value of the control equipment
I: Interest rate (District policy is to use 10%)
n: Equipment life (District policy is to use 10 years)

$$A = (\$1,102,046)\left[\frac{(0.1)(1+0.1)^{10}}{(1+0.1)^{10} - 1}\right] = \frac{\$179,300}{\text{yr}}$$

Because the capital recovery and annual costs of ammonia, catalyst replacement, and energy ($179,300/yr + $35,583/yr + $10,512/yr = $225,395/yr) correspond to a 62.5 MMBtu/hr unit, they wer adjusted using the "6/10" rule as follows:

$225,395/yr x $(85.0/62.5)^{0.6}$ = $271,061/yr

Annual Direct Cost (ADC):

Operation & Maintenance = $9,059/yr

Annual Indirect Cost (AIC) = $30,965/yr

Total Annualized Cost = CC + ADC + AIC
= $271,061 + $9,059 + $30.965
= $ 311,085/yr

Cost Effectiveness:

Cost effectiveness = $311,085/4.39 ton/yr
Cost effectiveness = $70,862/ton

The cost effectiveness is greater than the $24,500/ton cost effectiveness threshold of the District BACT policy. Therefore, the use of SCR with ammonia injection is not cost effective and is not required as BACT.

Step 5 – Select BACT for NOx

BACT for NOx emissions from each oilfield steam generator is 7 ppmv @ 3% O2. The applicant has proposed to install the steam generators each with a NOx limit of 7 ppmvd @ 3% O2; therefore, BACT for NOx emissions is satisfied.

Top Down BACT Analysis for VOC Emissions:

Step 1 - Identify all control technologies

The SJVUAPCD BACT Clearinghouse guideline 1.2.1, 3rd quarter 2010, identifies achieved in practice and technologically feasible BACT for Steam Generator $\geq$ 5 MMbtu/hr, at an oil field as follows:

2. Gaseous fuel - achieved in practice

Step 2 - Eliminate Technologically Infeasible Options

The above listed technology is technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

2. Gaseous fuel - achieved in practice

Step 4 - Cost Effectiveness Analysis

Only one control technology is identified and this technology is achieved in practice; therefore, a cost effectiveness analysis not necessary.

Step 5 - Select BACT for VOC

The use of gaseous fuel (natural gas) is selected as BACT for VOC emissions.

Top Down BACT Analysis for PM_{10} and SOx Emissions:

Step 1 - Identify all control technologies

The SJVUAPCD BACT Clearinghouse guideline 1.2.1, 3rd quarter 2010, identifies achieved in practice and technologically feasible BACT for Steam Generator $\geq$ 5 MMbtu/hr, at an oil field as follows:

2. Natural gas, LPG, waste gas treated to remove 95% by weight of sulfur compounds or treated such that the sulfur content does not exceed 1 gr of sulfur compounds (as S) per 100 scf, or use of a continuously operating SO2 scrubber and either achieving 95% by weight control of sulfur compounds or achieving an emission rate of 30 ppmvd SO2 at stack O2 - achieved in practice

Step 2 - Eliminate Technologically Infeasible Options

The above listed technology is technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

2. Natural gas, LPG, waste gas treated to remove 95% by weight of sulfur compounds or treated such that the sulfur content does not exceed 1 gr of sulfur compounds (as S) per 100 scf, or use of a continuously operating SO2 scrubber and either achieving 95% by weight control of sulfur compounds or achieving an emission rate of 30 ppmvd SO2 at stack O2 - achieved in practice

Step 4 - Cost Effectiveness Analysis

Only one control technology is identified and this technology is achieved in practice; therefore, a cost effectiveness analysis not necessary.

Step 5 - Select BACT for SOx and PM10

The use of natural gas as a primary fuel with a sulfur content not to exceed 0.75 gr-S/100 scf with no back up fuel is selected as BACT for SOx and PM_{10} emissions.

Top Down BACT Analysis for CO Emissions:

Step 1 - Identify all control technologies

The SJVUAPCD BACT Clearinghouse guideline 1.2.1, 3rd quarter 2010, identifies achieved in practice and technologically feasible BACT for Steam Generator ≥ 5 MMbtu/hr, at an oil field as follows:

2. 50 ppmvd @ 3% O2 - achieved in practice

Step 2 - Eliminate Technologically Infeasible Options

The above listed technology is technologically feasible.

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

2. 50 ppmvd @ 3% O2 - achieved in practice

Step 4 - Cost Effectiveness Analysis

Only one control technology is identified and this technology is achieved in practice; therefore, a cost effectiveness analysis not necessary.

Step 5 - Select BACT for CO

25 ppmvd CO @ 3% O2 is proposed and satisfies BACT for CO emissions.

SCR FOR STEAM GENERATOR; CAPITAL & OPERATING COSTS (RE-WORKED)

Direct Installation Costs

	Footnotes	Unit Cost	Amount
SCR Equipment (Purchase Costs)	(1)	A	$200,000
Instrumentation & Controls (22%)	(2)	0.22 A	$44,000
Foundation/Supports, Civil/Structural (15%)	(2)	0.15 A	$30,000
Handling/Erection, Equipment Install (15%)	(2)	0.15 A	$30,000
Electrical (15%)	(2)	0.15 A	$30,000
Piping (50%)	(2)	0.50 A	$100,000
Total Direct Cost		**B**	**$434,000**
Indirect Installation Costs			
Sales Tax & Freight (9%)	(2)	0.09 A	$18,000
FEL Engineering (5%)	(2)	0.05 B	$21,700
Detailed Engineering (21%)	(2)	0.21 B	$91,140
Construction Indirects (21%)	(2)	0.21 B	$91,140
Total Indirect Cost, IC		**C**	**$221,980**
Total Direct + Indirect		**D**	**$655,980**
Contingency (50%)		0.5 D	$327,990
Subtotal w/ Contingency		**E**	**$983,970**
G&A at 12% of Subtotal w/contingency		0.12 E	$118,076
Grand Total			$1,102,046
ANNUALIZED CAPITAL COST (@ I = 10% & N = 10 years) =			***$179,303***

ANNUAL MAINTENANCE & OPERATING COSTS

Description	Suggested Factor	Unit Cost	Cost
Direct Annual Costs, DC			
Op & Main Labor (630 man-hours/year) x 1/2	(3) & (4)	$25.0/hr	$7,875
Supervisor (15% of Operator)	(4)		$1,181
Materials: Catalyst & Ammonia	(4)	$35,583	$35,583
Energy (15 kW * $0.08/kW-hr * 8760 hrs/yr)	(5)	$0.08/kW-hr	$10,512
Indirect Annual Costs, DC			
Overhead (60% of O&M Labor)	(4)		$4,725
Admin Charges (2% of TECC)	(4)		$13,120
Property Taxes & Ins (2% of TECC)	(4)		$13,120
TOTAL ANNUAL MAINTENANCE & OPERATING COSTS			**$86,116**

TOTAL EQUIVALENT ANNUAL OPERATING COSTS ***$265,419***

References:

(1) Reflects budgetary estimate from C&C Panasia presented at 10/22/09 Meeting.

(2) Cost factors used by TJ Cross Engineers Inc. and referenced from "Plant Design and Economics for Chemical Engineers" by Peters and Timmerhaus, Third Edition.

(3) Hourly labor/maintenance rates typically assumed in BACT analyses. Assumed 50% of one Man.

(4) Direct/indirect installation costs and hourly labor/maintenance costs are estimated based on procedure OAQPS Control Cost Manual (EPA/452/B-02-001), Section 3.2, Chapter 1.

(5) Electrical cost of $0.08/kW-hr is consistent with past BACT reviews and is used to estimate annual energy cost due to added Horsepower requirements of SCR Equipment. Estimated at about 15 KW.

APPENDIX C

Compliance Certifications

CERTIFICATION

Aera Energy LLC hereby certifies as follows:

1. Aera Energy LLC owns or operates certain major stationary sources in the State of California. Such sources are comprised of a large number of emission points. As used in this certification, the term "major stationary source" shall, with respect to Aera Energy LLC stationary sources in the SJVUAPCD, have the meaning ascribed thereto in SJVUAPCD Rule 2201.3.24, and shall, with respect to all of Aera Energy LLC's other stationary sources in the State of California, have the meaning ascribed thereto in section 302(J) of the Clean Air Act (42 U.S.C. Section 7602 (J)).

2. Subject to paragraphs 3 and 4 below, all major stationary sources owned or operated by Aera Energy LLC in the State of California are either in compliance, or on an approved schedule of compliance, with all applicable emission limitations and standards under the Clean Air Act and all of the State Implementation Plan approved by the Environmental Protection Agency.

3. This certification is made on information and belief and is based upon a review of Aera Energy LLC's major stationary sources in the State of California by those employees of Aera Energy LLC who have operational responsibility for compliance. In conducting such reviews, Aera Energy LLC and its employees have acted in good faith and have exercised reasonable best efforts to identify any exceedances of the emission limitations and standards referred to in paragraph 2 thereof.

4. This certification shall speak as of the time and date of its execution.

CERTIFICATION

By: Frank B Cummings Date: 9/17/08

Title: EHS Manager Time: 3:30 p.m.

San Joaquin Valley
Unified Air Pollution Control District

TITLE V MODIFICATION - COMPLIANCE CERTIFICATION FORM

Authorities to Construct for Eight 85 MMBTU Steam Generators – North DSD Area

I. TYPE OF PERMIT ACTION (Check appropriate box)

[X] SIGNIFICANT PERMIT MODIFICATION [ ] ADMINISTRATIVE AMENDMENT
[ ] MINOR PERMIT MODIFICATION

COMPANY NAME: AERA ENERGY LLC	FACILITY ID: S-1547
1. Type of Organization: [X] Corporation [ ] Sole Ownership [ ] Government [ ] Partnership [ ] Utility	
2. Owner's Name: AERA ENERGY LLC	
3. Agent to the Owner: N/A	

II. COMPLIANCE CERTIFICATION (Read each statement carefully and initial **all** circles for confirmation):

(RA) Based on information and belief formed after reasonable inquiry, the emissions unit(s) identified in this application will continue to comply with the applicable federal requirement(s) which the emissions unit(s) is in compliance.

(RA) Based on information and belief formed after reasonable inquiry, the emissions unit(s) identified in this application will comply with applicable federal requirement(s) that will become effective during the permit term, on a timely basis.

(RA) Corrected information will be provided to the District when I become aware that incorrect or incomplete information has been submitted.

(RA) Based on information and belief formed after reasonable inquiry, information and statements in the submitted application package, including all accompanying reports, and required certifications are true, accurate and complete.

I declare, under penalty of perjury under the laws of the state of California, that the forgoing is correct and true:

R.A. Roeder — 9-15-02

Signature of Responsible Official — Date

R.A. Roeder

Name of Responsible Official (please print)

Process Supervisor

Title of Responsible Official (please print)

APPENDIX D

RMR and AAQA Summaries

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Michael Buss
From:	Matthew Cegielski-Technical Services
Date:	October 6, 2008
Facility Name:	AERA Energy
Location:	Sections 20, 29 and or 28, T28S, R21E Belridge, CA
Application #(s):	S-1547
Project #:	S-1084210 1162-0 through 1172-0

A. RMR SUMMARY

Categories	85 MMBtu/hr NG Steam Generator (Each Unit)	11 Units Project Totals	Facility Totals
Prioritization Score	0.0	0.007	>1
Acute Hazard Index	N/A[1]	N/A[1]	0.1[2]
Chronic Hazard Index	N/A[1]	N/A[1]	0.0[2]
Maximum Individual Cancer Risk (10^{-6})	N/A[1]	N/A[1]	1.6[2]
T-BACT Required?	**No**		
Special Permit Conditions?	**No**		

1 Even though the facility prioritization score was greater than one, no further analysis is required since the prioritization score for the project was insignificant (< 0.05).

2 Facility totals are maintained in the AERA Cumulative Risk document at G:\PER\TOXIC\ SCREEN\DATA \SOUTH\1547 Aera Energy

Proposed Permit Conditions

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Units 1162-0 through 1172-0

1. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap, roof overhang, or any other obstruction. [District Rule 4102] N
2. PM10 emissions shall not exceed 124 lb/day at location # 2038 (District Rule 2201)
3. PM10 emissions shall not exceed 168 lb/day at location # 2972 (District Rule 2201)
4. Standard conditions in the ATC

B. RMR REPORT

I. Project Description

Technical Services received a request on October 6, 2008 to perform a Risk Management Review (RMR) and an Ambient Air Quality Analysis (AAQA) for the installation of eleven 85 MMBtu/hr Natural Gas-Fired Steam Generators equipped with a Selective Catalytic Reduction (SCR) system for enhanced oil production in the Belridge Oilfield.

II. Analysis

Toxic emissions for this proposed unit were calculated using Ventura County's emission factors for natural gas external combustion. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905, March 2, 2001), risks from the proposed unit's toxic emissions were prioritized using the procedure in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEARTs database. The prioritization score for the proposed units were less than 1.0 (see RMR Summary Table). Therefore, no further analysis was necessary.

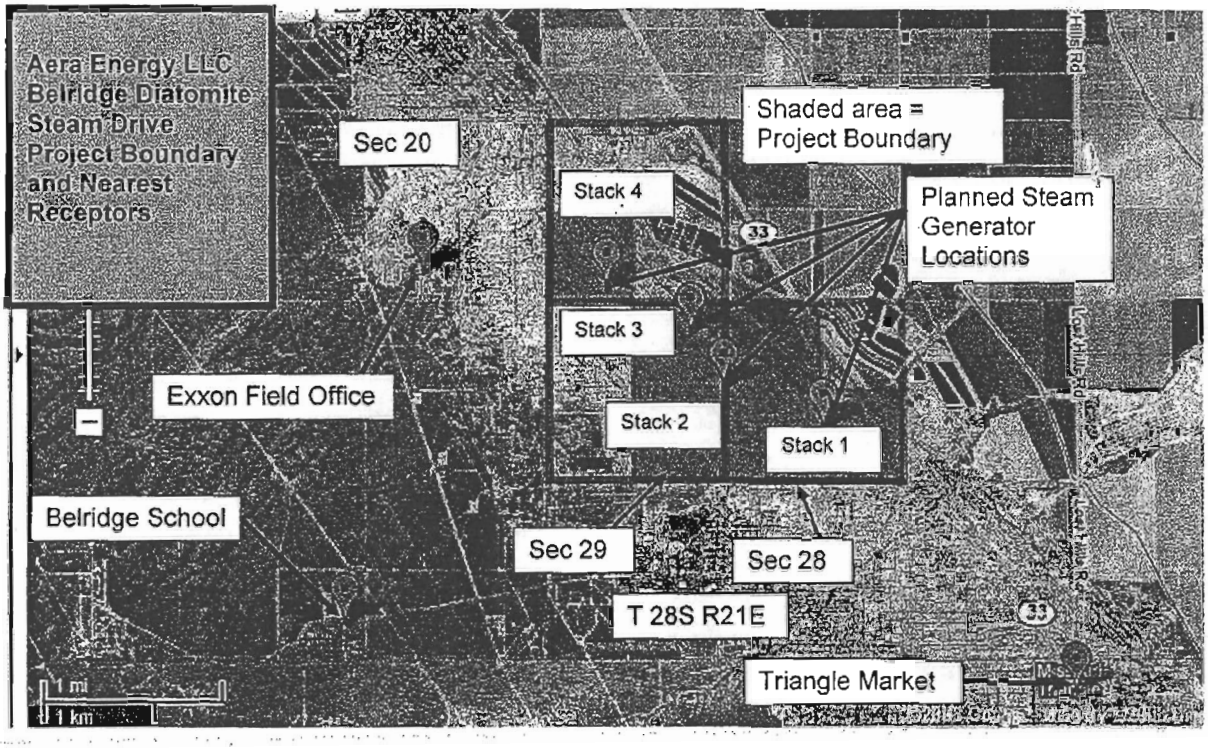
The following parameters were used for the review:

Analysis Parameters **NG fired Steam Generators (1162-0 through 1172-0, 11 units)**			
Source Type	Point	**Location Type**	Rural
Stack Height (m)	6.1	**Closest Receptor (m)**	2,408
Stack Diameter. (m)	0.76	**Type of Receptor**	Business
Stack Exit Velocity (m/s)	10.96	**Rating (MMBtu/hr)**	85
Stack Exit Temp. (°K)	394.3	**Max Hours per Year**	8760

Technical Services performed AAQA modeling for criteria pollutants CO, NOx, SOx and PM_{10}; to determine the maximum allowable emissions from the four proposed locations for the use of 19 Natural Gas Fired Steam Generators, 11 from this project and 8 from project 1084433. The emission rates used for criteria pollutant modeling are listed in the table below:

Criteria Pollutant	**NG SG 5ppmv NOX lb/yr**	**11 units total lb/yr**	**NG SG 7ppmv NOX lb/yr**	**8 units total lb/yr**
NOx	4,519	49,709	6,200	49,600
SOx	1,596	17,556	1,564	12,512
PM10	5,659	62,249	5,546	44,368
CO	13,752	151,272	13,477	107,816
VOC	2,234	24,574	2,189	17,512

The locations proposed are illustrated in the diagram below:



The location coordinates are listed below:

Stack	AERA listing	UTM N	UTM E
1	Loc 2857	253,587.4	3,927,373
2	Loc 2829	252,699.5	3,927,762
3	Loc 2972	252,413.5	3,928,275
4	Loc 2038	251,669	3,928,698

Stack 4 was determined to be the greatest contributor of the locations to the emissions that could exceed the Ambient Air Quality Standards. The modeling of the stacks was simplified to a worst case scenario to model multiple Steam Generators stacks' emissions as one stack in each location. In analyzing the maximum allowable emissions possible at each location, stack 4 was used as the default location for any extra steam generators not used at the location in question. When considering stack 4, stack 3 was determined to be the next greatest contributor.

The modeling that resulted in the maximum allowable emissions was having 8 steam generators (5 ppmv type) at stack 4 and the rest at stack 3 (3 of the 5ppmv type and 8 of the 7ppmv type). The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*

Diesel ICE	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	Pass	X	Pass	X	X
NO_x	Pass	X	X	X	Pass
SO_x	Pass	Pass	X	Pass	Pass
PM_{10}	X	X	X	Pass	Pass

*Results were taken from the attached PSD spreadsheet.
[1]The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

The threshold for PM10 was reached in the scenario described above with the following results:

PM_{10} Pollutant Modeling Results*
Values are in $\mu g/m^3$

Category	24 Hours	Annual
Proposed	5.03	0.78
Significance Level	5.0	1.0
Result	Pass	Pass

The associated PM10 daily emission limits are listed in the proposed permit conditions section. No limits were necessary for locations associated with stacks 1 and 2.

III. Conclusion

The prioritization score is less than 1.0. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

To ensure that human health risks will not exceed District allowable levels; the permit conditions listed on page 1 of this report must be included for this proposed unit.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

AAQA
The emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS if compliance with the proposed conditions is maintained.

Attachments:
A. RMR Request
B. AAQA
C. Toxic emissions summary
D. Prioritization score
E. Miscellaneous

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Michael Buss
From:	Matthew Cegielski-Technical Services
Date:	October 6, 2008
Facility Name:	AERA Energy
Location:	Sections 20, 29 and or 28, T28S, R21E Belridge, CA
Application #(s):	S-1547
Project #:	S-1084433 1173-0 through 1180-0

RECEIVED
OCT - 9 2008
SJVAPCD
Southern Region

A. RMR SUMMARY

Categories	85 MMBtu/hr NG Steam Generator (Each Unit)	8 Units Project Totals	Facility Totals
Prioritization Score	0.0	0.005	>1
Acute Hazard Index	N/A[1]	N/A[1]	0.1[2]
Chronic Hazard Index	N/A[1]	N/A[1]	0.0[2]
Maximum Individual Cancer Risk (10^{-6})	N/A[1]	N/A[1]	1.6[2]
T-BACT Required?	No		
Special Permit Conditions?	No		

1 Even though the facility prioritization score was greater than one, no further analysis is required since the prioritization score for the project was insignificant (< 0.05).
2 Facility totals are maintained in the AERA Cumulative Risk document at G:\PER\TOXIC\ SCREEN\DATA \SOUTH\1547 Aera Energy

Proposed Permit Conditions

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Units 1173-0 through 1180-0

1. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap, roof overhang, or any other obstruction. [District Rule 4102] N
2. PM10 emissions shall not exceed 124 lb/day at location # 2038 (District Rule 2201)
3. PM10 emissions shall not exceed 168 lb/day at location # 2972 (District Rule 2201)
4. Standard conditions in the ATC

B. RMR REPORT

I. Project Description

Technical Services received a request on October 6, 2008 to perform a Risk Management Review (RMR) and an Ambient Air Quality Analysis (AAQA) for the installation of eight 85 MMBtu/hr Natural Gas-Fired Steam Generators for enhanced oil production in the Belridge Oilfield.

II. Analysis

Toxic emissions for this proposed unit were calculated using Ventura County's emission factors for natural gas external combustion. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905, March 2, 2001), risks from the proposed unit's toxic emissions were prioritized using the procedure in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEARTs database. The prioritization score for the proposed units were less than 1.0 (see RMR Summary Table). Therefore, no further analysis was necessary.

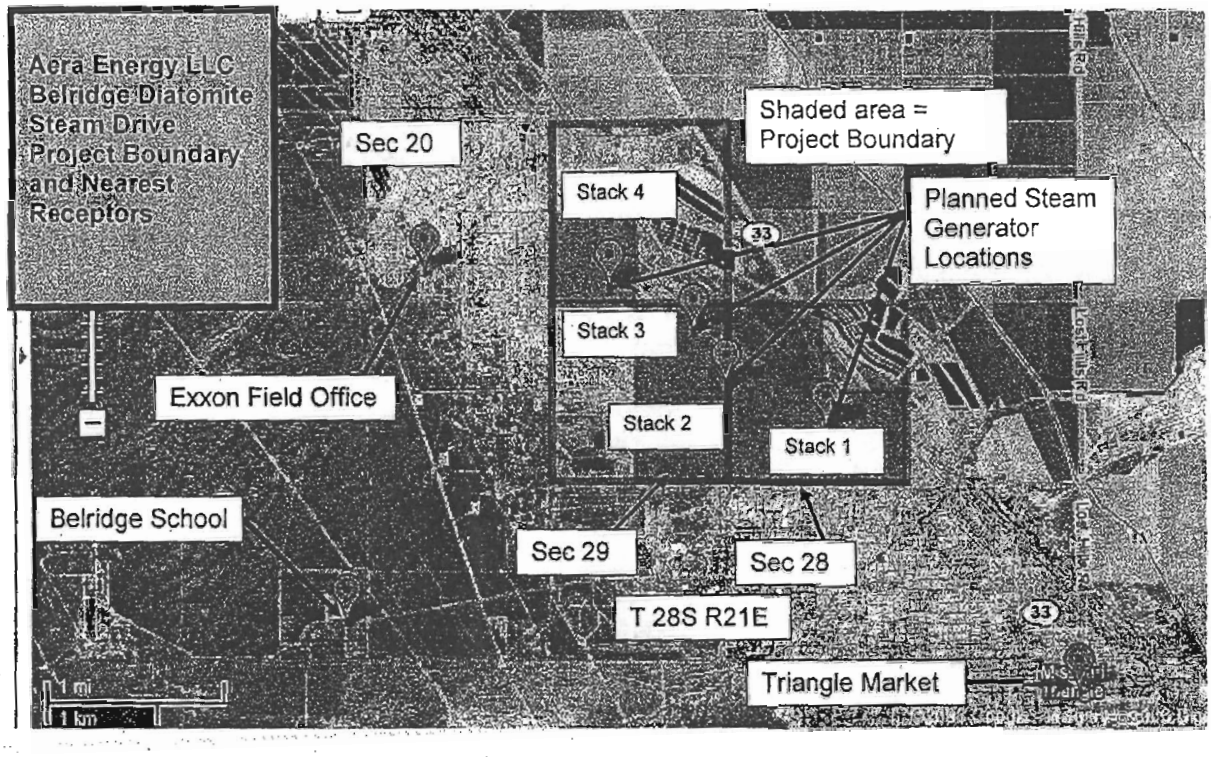
The following parameters were used for the review:

Analysis Parameters **NG fired Steam Generators (1173-0 through 1180-0, 8 units)**			
Source Type	Point	**Location Type**	Rural
Stack Height (m)	6.1	**Closest Receptor (m)**	2,408
Stack Diameter. (m)	0.76	**Type of Receptor**	Business
Stack Exit Velocity (m/s)	10.96	**Rating (MMBtu/hr)**	85
Stack Exit Temp. (°K)	394.3	**Max Hours per Year**	8760

Technical Services performed AAQA modeling for criteria pollutants CO, NOx, SOx and PM_{10}; to determine the maximum allowable emissions from the four proposed locations for the use of 19 Natural Gas Fired Steam Generators, 8 from this project and 11 from project 1084210. The emission rates used for criteria pollutant modeling are listed in the table below:

Criteria Pollutant	NG SG 5ppmv NOX lb/yr	11 units total lb/yr	NG SG 7ppmv NOX lb/yr	8 units total lb/yr
NOx	4,519	49,709	6,200	49,600
SOx	1,596	17,556	1,564	12,512
PM10	5,659	62,249	5,546	44,368
CO	13,752	151,272	13,477	107,816
VOC	2,234	24,574	2,189	17,512

The locations proposed are illustrated in the diagram below:



The location coordinates are listed below:

Stack	AERA listing	UTM N	UTM E
1	Loc 2857	253,587.4	3,927,373
2	Loc 2829	252,699.5	3,927,762
3	Loc 2972	252,413.5	3,928,275
4	Loc 2038	251,669	3,928,698

Stack 4 was determined to be the greatest contributor of the locations to the emissions that could exceed the Ambient Air Quality Standards. The modeling of the stacks was simplified to a worst case scenario to model multiple Steam Generators stacks' emissions as one stack in each location. In analyzing the maximum allowable emissions possible at each location, stack 4 was used as the default location for any extra steam generators not used at the location in question. When considering stack 4, stack 3 was determined to be the next greatest contributor.

The modeling that resulted in the maximum allowable emissions was having 8 steam generators (5 ppmv type) at stack 4 and the rest at stack 3 (3 of the 5ppmv type and 8 of the 7ppmv type). The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*

Diesel ICE	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	Pass[1]	X	Pass[1]	X	X
NO_x	Pass[1]	X	X	X	Pass[1]
SO_x	Pass[1]	Pass[1]	X	Pass[1]	Pass[1]
PM_{10}	X	X	X	Pass[1]	Pass[1]

*Results were taken from the attached PSD spreadsheet.
[1]The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

The threshold for PM10 was reached in the scenario described above with the following results:

PM_{10} Pollutant Modeling Results*
Values are in $\mu g/m^3$

Category	24 Hours	Annual
Proposed	5.03	0.78
Significance Level	5.0	1.0
Result	Pass	Pass

The associated PM10 daily emission limits are listed in the proposed permit conditions section. No limits were necessary for locations associated with stacks 1 and 2.

III. Conclusion

The prioritization score is less than 1.0. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

To ensure that human health risks will not exceed District allowable levels; the permit conditions listed on page 1 of this report must be included for this proposed unit.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

AAQA
The emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS if compliance with the proposed conditions is maintained.

Attachments:
A. RMR Request
B. AAQA
C. Toxic emissions summary
D. Prioritization score
E. Miscellaneous

APPENDIX E

BPS for CEQA-GHG Compliance

AERA

July 12, 2010

San Joaquin Valley APCD
1990 East Gettysburg Avenue
Fresno, CA 93726-0244

ATTN: Jessica Willis

RE: CEQA / GHG Requirements for Aera 85 MMBTU/hr Steam Generator Projects

Attached are CEQA documents to support the following projects for Aera facility ID S-1547:

S-1084210/S-1084433
S-1084406/S-1084434

Attachments are as listed:

- Summary page for steam generator Best Performance Standard
- Specification excerpts for steam generator convection section
- Calculation of heat transfer surface/heat input ratio
- Specification excerpts for high-efficiency motor specifications

Should you have any questions concerning this submittal or require additional information, do not hesitate to contact me at (661) 665-4363.

Sincerely,

Brent Winn
Environmental Engineer – Belridge
Attachment(s)

CC: Dolores Gough
Southern Region

San Joaquin Valley
Unified Air Pollution Control District

Best Performance Standard (BPS) x.x.xx

Date: 6/24/10

Class	Steam Generators
Category	Oilfield
Best Performance Standard	**Very High Efficiency Steam Generator Design With:** 1. A convection section with at least 235 square feet of heat transfer surface area per MMBtu/hr of maximum rated heat input (verified by manufacturer) or a manufacturer's overall thermal efficiency rating of 88%. **And** 2. Variable frequency drive high efficiency electrical motors driving the blower and water pump.
Percentage Achieved GHG Emission Reduction Relative to Baseline Emissions	13.0%

District Project Number	C-1100391
Evaluating Engineer	Steve Roeder
Lead Engineer	Arnaud Marjollet
Initial Public Notice Date	April 28, 2010
Final Public Notice Date	May 28, 2010
Determination Effective Date	June 24, 2010

Attachment 2

Specification Excerpts for

Steam Generator Convection Section

85 MMBTU/HR OILFIELD STEAM GENERATOR

For DSD Cyclic Service Pressure Rating of 2060 psig
and
For DSD Continuous Service Pressure Rating of 1850 psig

Aera Energy LLP
Belridge Oil Field
McKittrick, California

November 7, 2007
(updated 6/09/2010)

TABLE OF CONTENTS

burner end wall and will be air-cooled and one will be on the target wall of the radiant section to view flame pattern. CONTRACTOR shall install access platform and steps to allow for safe and easy viewing on the target wall. The view window shutters are to be equipped with a positive lock close device.

2.3.5. The radiant section shall be provided with a minimum of two (2) drain connections as described in Section 2.6.

2.3.6. A high point vent for the generator must be installed in the piping between the convection section and the radiant section.

2.3.7. Radiant section will have heat transfer calculations completed, by CONTRACTOR, showing the duty of the steam generator. This should be submitted to COMPANY for approval prior to drawing approval.

2.4. CONVECTION SECTION

2.4.1. Generator shall be provided with a new lay down high efficiency style convection section. (PCL Econovection or equivalent)

2.4.2. Fin density on finned convection tubes shall be no more than 6 fins per inch with maximum 1" high, 0.059-inch thick fins. Fins are to be a combination of solid and serrated design and are to be high frequency continuously welded to pipe. Minimum surface area of the convection section shall be 635 bare plus 25,785 extended square feet.

2.4.3. Inlet and outlet piping shall be ANSI Class 1500 raised face flanged fittings for quick assembly and disassembly. Flanged piping spools are to be provided for pigging the convection section. Flange gaskets shall be spiral wound metallic gaskets, Flexitallic type CGI or Selco Gaskets.

2.4.4. All convection section to transition section and stack flanges shall have double thickness gaskets consisting of ceramic fiber gasket material. CONTRACTOR should consider eliminating bolt up transition section in favor of welded transition to radiant and convection system.

2.4.5. Design working pressure (MAWP) shall be per the value listed in data sheet

2.4.6. Exhaust stack shall be separate from convection section and shall be connected by a transition section. The exhaust stack will be designed by CONTRACTOR and have a 48" diameter and be 20' tall. It will be mounted onto its own structural steel skid. Contractor's design shall provide for Flue Gas Recirculation system and allow for all emissions sampling requirements. (See Section 2.4.12 & 2.4.13)

2.4.7. New lay down convection section will have heat transfer calculations

completed, by CONTRACTOR, showing the duty of the steam generator. This should be submitted to COMPANY for approval prior to drawing approval.

2.4.8. Convection Section Refractory

A. General

Convection section doors shall be covered with ceramic fiber. Steel under ceramic fiber shall be protected by an internal coating specified in section 2.14. Replacement refractory on the floor of the transition section shall be castable refractory. Following installation of convection and radiant at site, CONTRACTOR to insulate the transition section seams.

B. Installation

Castable refractory installed in the transition section shall have a minimum uniform thickness of 6 inches. Castable refractory type referenced in Radiant section is recommended.

2.4.9. The convection section shall be equipped with a drain located at lowest point per Section 2.6.

2.4.10. An excess Oxygen sample connection shall be installed in the stack.

2.4.11. Sample connections shall be installed on the exhaust stack. Two 3" Couplings with plugs shall be installed 90° apart near the top of the stack, per the requirements of EPA 40CFR60. A third 3" Coupling shall be installed at about 5' above grade.

2.4.12. One unit will require a stack extension for PM 10 testing per EPA 40CFR60. Two ports should be 6" pipe and extend a minimum of 4" from the exterior of the stack wall to allow the installation of test adapters. The ports should be installed on perpendicular diameters and situated to allow access by a technician working from the basket of a man-lift.

2.5. STRUCTURAL SKID

2.5.1. All cab personnel access areas shall be fully covered with new removable welded steel bar grating, 1-1/4" x 1/8" serrated, hot-dip galvanized, with stainless steel saddle clips.

2.5.2. Where penetrations through structural components of the skid frame are required for routing of piping and conduit, a sleeve shall be installed to ensure that structural integrity is not reduced. Sleeves shall consist of Schedule 80 pipe, four inches long, one size larger than the pipe or conduit passing through the structural member.

Attachment 3

Calculation Of Heat Transfer Surface/Heat Input Ratio

The convection section for the subject steam generators is to include fins with a combination of solid and serrated design and are to be high frequency continuously welded to pipe. Minimum surface area of the convection section shall be 635 bare plus 25,785 extended square feet. [Total surface area 26,420 square feet].
Rated heat input = 85 MMBTU/hr
Ratio of surface area to heat input: 26,420 sq ft / (85 MMBTU/hr) = **310.8 sq ft per MMBTU/hr of heat input** [BPS criteria = 235 sq ft per MMBTU/hr]

Attachment 4

Specification Excerpts For High-Efficiency Motor Specifications

for Fuel Gas.

2.7.15. Hydrostatic testing requirements are as follows:

A. All piping shall be hydrotested to l.5 times MAWP with hold time per applicable Code.

B. Test procedure to be approved by COMPANY. All hydrotesting shall be witnessed by COMPANY.

2.8. PIPING INSULATION

2.8.1. CONTRACTOR shall provide all labor, equipment, materials and supervision to install, inspect and test insulation requirements on piping and vessels.

2.8.2. Feedwater piping shall be insulated for personal protection. Convection section discharge piping and steam discharge piping shall be insulated for thermal heat conservation. Insulated lines shall have shoes at all pipe supports.

2.8.3. Insulation shall be 8 lb/ft^3 pre-formed Mineral Wool.

2.8.4. Minimum insulation thickness for personal protection shall be perforated aluminum jacketing or 1" expanded metal with 1" standoff.

2.8.5. Insulation thickness for thermal heat conservation shall be three inches (3") for feedwater and four inches (4") for steam piping.

2.8.6. New 0.016 inch thick aluminum jacketing shall be used, with a 2-inch overlap, fastened with cadmium-plated screws or stainless steel banding.

2.8.7. Valves, flow meters, pigging blind flanges etc. shall have blanket insulation jackets.

2.9. FEED WATER

2.9.1. COMPANY will be using and supplying individual National Oilwell 300Q-5Mpositive displacement pump with high efficiency 250 hp motor to supply feed water to each Steam Generator.

2.9.2. CONTRACTOR shall supply a 250 hp VFD system for the feedwater pump which will be installed in cab section of Steam Generator.

2.9.3. CONTRACTOR shall provide for installation, wiring, and controls of the pump VFD.

2.10. FUEL GAS SYSTEM

2.10.1. CONTRACTOR shall supply fuel gas piping, controls, and instruments per P&ID. Maxon or equivalent Safety Valves and Fisher Control Valves shall be provided.

2.10.2. The fuel gas & pilot vent valves installed between the shutoff valves shall be vented to a point two (2) feet above the top of the radiant section.

2.11. BURNER AND BLOWER

2.11.1. The steam generator will be equipped with a new CONTRACTOR provided North American 4231-85 GLE Ultra Low NOx Combustion System with flue gas re-circulation or equivalent, oxygen controller, and variable speed drive on the blower. Fuel gas piping ahead of the burner shall be installed by CONTRACTOR, and shall have UV type flame detectors and a gas pilot.

2.11.2. When there is a conflict in specifications that may affect safety or emissions performance, the requirements of the burner manufacturer shall take precedence over the requirements of this specification.

2.11.3. Generator will be equipped with new CONTRACTOR supplied, North American forced draft high efficiency 150 hp combustion air blower or equivalent, sized for the firing rate and operating pressure of the burner using a variable speed drive.

2.11.4. CONTRACTOR shall laser align the burner to +/- .5" (one half inch) along a centerline from the burner mounting wall to the target wall.

2.11.5. CONTRACTOR shall supply Rosemount WC-3000 Oxygen Analyzers.

2.11.6. The primary and secondary fuel valves shall control firing rate.

2.11.7. CONTRACTOR shall install field proven Flue Gas Recirculation System.

2.12. INSTRUMENTATION AND AIR SYSTEM

2.12.1. All instrument tubing shall be new. Instrument air supply and signal transmission tubing shall nominally be 1/4" OD x 0.035" wall 316 stainless steel per ASTM A269. Process tubing shall nominally be 3/8" OD x 0.049" wall 316 stainless steel per ASTM A269. All tubing fittings shall be Swagelok or COMPANY approved equal.

2.12.2. CONTRACTOR shall supply and install new pressure gauges, temperature gauges, and thermowells.

Low Voltage, Squirrel-Cage Induction Motors

Document Status			Eng Approvals			Aera Approvals	
Rev.	Date	Reason for Issue	Orig.	QA	Mgmt. Appr.	Disc.	Mgmt. Appr.
0	8/03/09	Issued for Construction	CPE – EE	CPE – EE	KL	Electrical	KL

TABLE OF CONTENTS

LOW VOLTAGE SQUIRREL CAGE INDUCTION MOTORS

1.0 SCOPE

This specification defines the minimum requirements for low-voltage, squirrel-cage, induction motors in the NEMA frame sizes for classified electrical hazardous and non-classified area service. Driven equipment specifications and motor data sheets shall be used to supplement this specification and identify any special requirements.

This specification does not include rod pump motors.

2.0 REFERENCES

The following publications form a part of this Guide. Unless otherwise specified herein, use the latest edition.

AFBMA (Anti-Friction Bearing Manufacturers Association) Standard

9	Load Ratings and Fatigue Life for Ball Bearings
10	Load Ratings and Fatigue Life for Roller Bearings
11	Load Rated and Fatigue Life for Sleeve Bearings

IEEE (The Institute of Electrical and Electronics Engineers) Standards

85	Test Procedure for Airborne Sound Measurements on Rotating Electric Machinery
112	Standard Test Procedure for Polyphase Induction Motors and Generators.
841	Recommended Practice for Chemical Industry Severe Duty Squirrel-Cage Induction Motors — 600 V and Below
1	General Principles for Temperature Limits in the Rating of Electric Equipment and for the Evaluation of Electrical Insulation

NEMA (National Electrical Manufacturers Association) Standard

MG 1	Motors and Generators

NFPA (National Fire Protection Association) Code

70	National Electrical Code

American National Standards Institute/Underwriters Laboratories, Inc. (ANSI/UL)

547	Thermal Protectors for Motors
674	Electric Motors and Generators for Use in Hazardous Locations, Class 1 Groups C and D, Class 2 Groups E, F and G.
1349	IEEE Guide for Application of Electric Motors in Class I, Division 2 Hazardous (Classified) Locations

3.0 GENERAL

3.1 The references and requirements of GN00-GEN-500-001-DES shall apply to this Guide.

3.2 Squirrel-cage induction motors, 600 V and below rated less than 250 hp in NEMA frame size shall conform to IEEE Std 841.

3.3 Squirrel-cage induction motors, 600V and below rated from 250 hp to 500 hp in NEMA frame sizes shall conform to IEEE Std 841 for the following cases:

(a) TEFC or TENV motors

(b) Drive centrifugal loads (or API 547)

(c) Drive loads having inertia values within those listed in NEMA MG1 Part 20 or API 547

(d) Not induction generators

(e) Drive belted loads

(f) Drive axial loads

(g) Drive vertical pumps

(h) Adjustable speed drive service

3.4 Motor noise level shall be determined in accordance with IEEE 85. Levels of noise generated by a motor shall not exceed 85dbA at a distance of 3.3ft unless specified otherwise on the data sheet.

3.5 High-efficiency and high power factor motors are recommended for driving equipment that will be in continuous operation. Guaranteed

minimum and nominal percent efficiencies, percent power factor, and amperes at full load, ¾ load, ½ load shall be provided. Efficiencies shall be determined by tests performed in accordance with Method B of ANSI/IEEE 112.

3.6 Motors shall be designed for operation in a dusty environment, at a temperature of up to 110°F and at an elevation of up to 3300 ft above sea level unless specified otherwise on the data sheets.

4.0 APPLICATION

4.1 Generally, three-phase squirrel-cage induction motors shall be used to drive pumps, blowers, agitators, compressors, and other constant-speed continuously-operated equipment. Motors shall have ample capacity to supply the maximum output demanded by the driven equipment and shall have a speed-torque-current characteristic appropriate to the driven equipment.

4.2 When the power requirement of the driven equipment falls between two standard motor ratings, the motor having the larger power rating shall be selected. Service factors shall not be used in the selection of the motor power rating unless approved by Aera.

4.3 All motors and auxiliary equipment to be installed in classified locations shall meet the equipment and installation requirements specified in NFPA 70. When the motor and auxiliary equipment are to be installed in a classified location, the contractor (in conjunction with Aera) shall specify the Class, Atmosphere Group, and Division classification, and the type of enclosure required for both the motor and auxiliary equipment.

4.4 Generally, motors shall be suitable for continuous duty. Motors with limited duty ratings that are supplied as valve actuators by the valve operator manufacturers for intermittent opening and closing operation are exceptions to this requirement.

4.5 Motors shall be suitable for operation in severe environments. Motors, including internal components, shall be protected to resist chemicals, moisture, and abrasives.

4.6 Where applicable, motor frame sizes shall be selected in accordance with NEMA MG 1. Motors of the same rating, mounting, and characteristics shall be interchangeable.

4.7 Induction motors driving centrifugal pumps, compressors, blowers, mixers, and similar rotating equipment shall normally be Design B, as

defined in NEMA MG 1, with normal torque and low starting current. Motors driving reciprocating or other similar equipment that require high starting torque shall be Design C, as defined in NEMA MG 1, with high starting torque and low starting current. Single-phase fractional horsepower motors shall be NEMA Design N.

4.8 Motor shall be designed to overcome starting load inertia and accelerate the load to rated speed within 15 seconds at 80 percent of rated nameplate voltage, without exceeding the motor time-temperature damage curve.

4.9 Special operating conditions shall be individually considered and specified in conformance with the requirements of the driven equipment. Such conditions include automatic and frequent starting, operation of induced-draft fans under cold and hot air temperatures, and variable or multispeed operation.

4.10 In addition to the other requirements of this Guide, the following shall apply to belt-connected vertically-mounted motors installed for air-cooler fan applications:

(a) The motor manufacturer shall be advised as to the type of motor drive arrangement, method of mounting, and environment in which the motor will be operated.

(b) Preferably, motors should be located below the air cooler. Installations requiring the motor to be mounted above the air cooler shall be approved by Aera.

(c) The belt sheaves on motors mounted with the shaft up shall be designed or modified to prevent water from accumulating and then be directed down the motor shaft.

(d) A shaft slinger shall be shrink-fitted or cemented on the motor shaft directly above the motor housing. The slinger shall be of adequate diameter and tightness to direct water away from the bearing housing and to prevent water from entering the motor housing along the shaft both when the motor is stationary and while it is running.

(e) Motors shall be provided with Class F insulation systems in accordance with Paragraph 5.7.1.

(f) Motors shall be provided with threaded drain plugs in the lower end bell to allow removal of moisture.

(g) Motors shall be provided with an epoxy compound coating on the end turns and on the air gap surfaces of the rotor and stator.

(h) Where available and suitable for the application, motors having roller-type drive-end bearings should be considered for V-belt drives.

(i) For bearing and lubrication considerations, refer to Paragraph 7.2.11.

4.11 Motors to be operated from adjustable-frequency power supplies for adjustable-speed drive applications shall be inverter duty rated to provide satisfactory performance. The motor manufacturer shall be consulted before selecting a motor for such applications.

4.12 Motors shall have a 1.15 service factor (SF) rating unless specified otherwise on the data sheets. Motor nameplate horsepower rating (at 1.0 SF) shall be at least 1.15 times the maximum continuous brake horsepower of the load at all operating conditions.

5.0 ELECTRICAL DESIGN FEATURES

5.1 General

5.1.1 Motor sizes generally shall be selected to operate at the following voltage levels:

	Motor Size		
	kW	HP	
Nonessential service	0.4 and below	½ and below	115/230V, single-phase
Continuous/Critical process	0.4 and below	½ and below	460V, three-phase
	0.4 through 112	½ through 200	460V, three-phase

5.1.2 When motor rated voltages are not specified in the project specifications, the voltages shall be selected by the contractor and submitted to Aera for approval.

5.1.3 The rated nameplate voltage of a motor shall not be greater than approximately 96 percent of the nominal system voltage.